1998-2005 GENINFO

Overall vehicle - 163 Chassis

GENERAL INFORMATION

NOTES ON SELF-LOCKING NUTS AND BOLTS - AH00.00-N-0001-01A

All models

Important repair information

Bolts with locking splines, micro-encapsulated bolts and self-locking nuts must always be replaced after being used once.

There is an increased risk of injury when unscrewing micro-encapsulated bolts due to the sudden breakaway torque.

Before new micro-encapsulated bolts are screwed in, the mating thread must be re-cut in order to remove all the residue of the old bolt locking compound.

MEASURES FOR PREVENTING DAMAGE TO VEHICLES OR COMPONENTS WHEN PERFORMING ARC WELDING WORK - AH00.00-N-0005-01A

All models

The following measures must be taken **before** welding in order to prevent damage to various vehicle components:

1 Have fire extinguishers at the ready.

2 The negative terminal of the battery must be disconnected and covered up.

3 In vehicle with airbags the red, 12-pin test connection/plug-in connection must be disconnected no sooner than two seconds after the battery has been disconnected (risk of unwanted activation).

6 Attach protective shields to prevent flying sparks and radiated heat in endangered areas.

7 Do not touch electronics housings or electrical cables with the welding electrode or the welder's ground connection.

8 If two parts are being welded together, both parts must be attached to the welder's negative clamp.

9 Make direct connection between the electrical welder's ground connection and the part being welded. Ensure that there are no electrically insulating parts between the ground connection and the welding point.

10 Protect or remove any parts that are sensitive to heat such as plastic cables.

11 Remove electrical cables that are laid in cavities and/or pipelines, covered containers and electrical components from the danger area before welding.

12 If possible, the points where the welded part is being attached to the vehicle and the ground terminal is attached to the electrical welder must be bare; remove all traces of paint, corrosion, oil, grease and

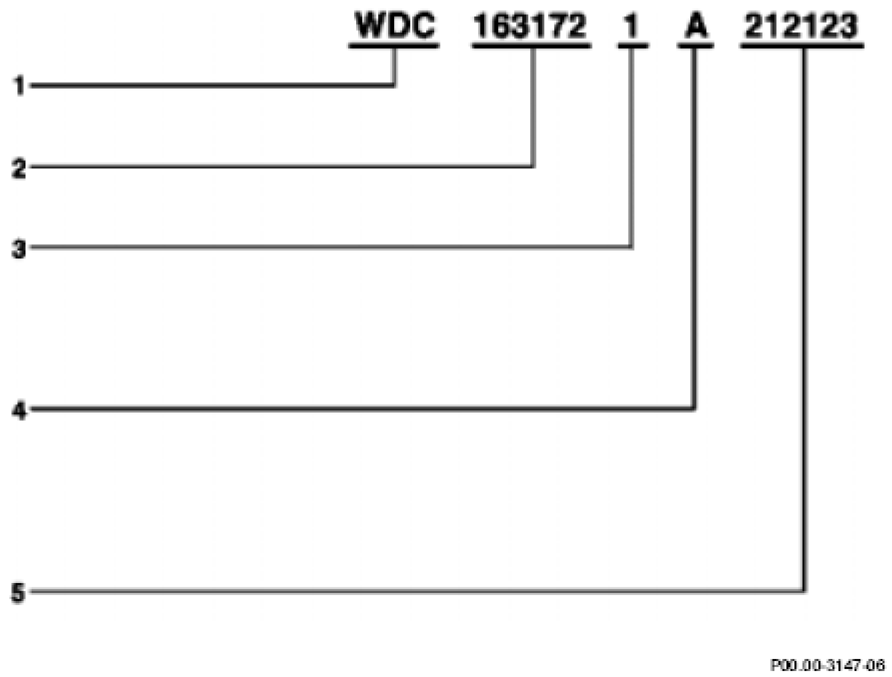
soiling.

13 The ground terminal of the welder must not be attached to the transmission. The welding current can cause arcing at the bearing points inside the transmission. The structural changes that this causes lead to premature failure of the equipment.

CHASSIS NUMBER BREAKDOWN - AH00.00-P-2000-01GH

Model 163

[i] Valid for all ECE vehicles without code 986 except NAFTA.



1 *World manufacturer code:*
WDC=MBUSI

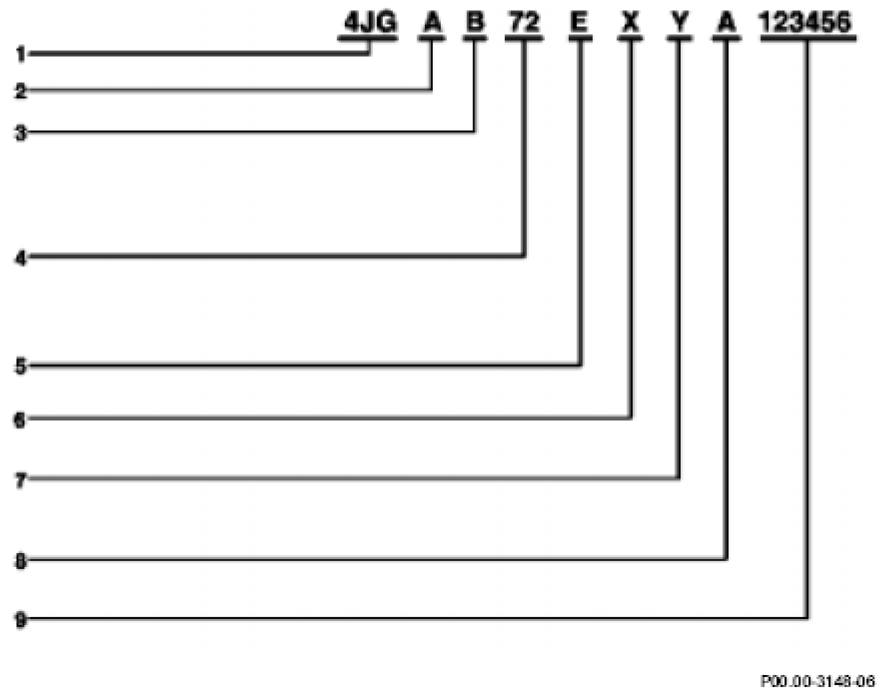
2 *Vehicle model*
163=M-class
163.113=ML 270 CDI, 163.128=ML 400 CDI,
163.136=ML 230, 163.154=ML 320,
163.172=ML 430, 163.174=ML 55 AMG, 163.175=ML 500

4 *Manufacturing plant*
A Tuscaloosa
X Graz

5 *Chassis number (production consecutive number)*
[i] *Begins in the case of vehicles of Graz production with a " 7"*

Fig. 1: Identifying Chassis Number (Valid For All ECE Vehicle Without Code 986 Except NAFTA)

[i] Valid for all NAFTA vehicles and ECE vehicles with code 986



1 *Manufacturer:*
4JG=MBUSI

2 *Model:*
A=163 = M-class

3 *Body version:*
A=Sedan; B=Sedan, long
C=T-model; D=Coupé
E=Cabriolet/Roadster; M=AMG vehicle

4 *Model designation:*
13= ML 270, 28=ML 400, 36=ML 230, 54=ML 320,
72=ML 430, 74=ML 55 AMG, 75=ML 500

5 *Weight class:*
E=2723 - 3175 kg

6 *Test digit*

7 *Model year:*
W=1998, X=1999, Y=2000, 1=2001, 2=2002

8 *Manufacturing plant:*
A=Tuscaloosa
X=Graz

9 *Chassis number (production consecutive number)*
[i] Begins in the case of vehicles of Graz production with a " 7"

Fig. 2: Identifying Chassis Number (Valid For All NAFTA And ECE Vehicles With Code 986)

LAYOUT OF VEHICLE DATA CARD - AH00.00-P-3000-01B

Models 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210, 215, 220 as of 01.01.78

Front of vehicle data card

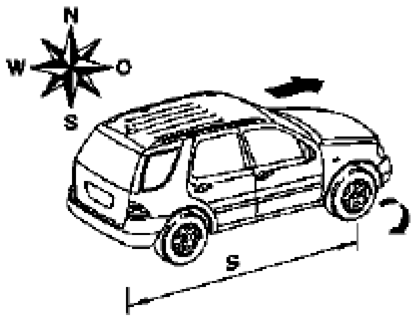


Fig. 3: Layout Of Vehicle Data Card - Front Of Vehicle Data Card

Back of vehicle data card

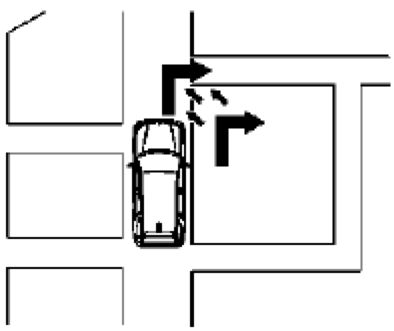


Fig. 4: Layout Of Vehicle Data Card - Back Of Vehicle Data Card

i The vehicle data card with all the essential data is required to be able to find the correct replacement parts for a particular vehicle.

This requires data that cannot be accommodated on the vehicle (e.g. on the model plate) any more.

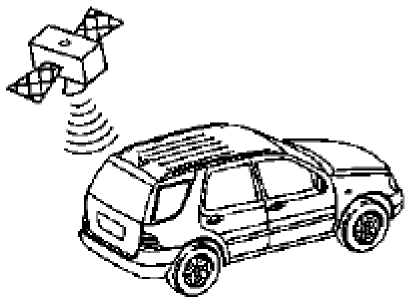
The vehicle data card format DIN A5 (approx. 21.0 x 14.5 cm) was introduced in January 1978 as a standard for all manufacturing plants. Only the vehicle data card that is glued into the service booklet has a size of approx. 10.0 x 19.5 cm. The back of this card remains empty. As of 01.09.2005, the vehicle data card is no longer glued into the service booklet.

Field contents	Comments
Chassis number	The chassis or vehicle identification number is the identification number of every vehicle. It also provides information on the version and the manufacturing plant of this vehicle. The preceding letter combination WDB is the World Manufacturer Code and means "Westdeutschland Daimler-Benz" ("Western Germany Daimler-Benz"). It has no meaning as far as replacement parts are concerned.

Engine number	The engine number is the identification number for every engine. It also provides information on the version of this engine.
Sales Designation	Is used for several model series. 240 D is used for instance for models 115, 123. Is used to determine a microfiche of the replacement part literature only in combination with the model (= the first 3 digits of the chassis number).
Transmission number	The complete transmission number is specified on the data card. It is the identification number or every transmission.
Groups and SA (optional equipment) numbers (as of 1983, not on vehicle data card in maintenance booklet)	The special equipment numbers are arranged based on ascending groups. Special equipment numbers are listed several times, if they pertain to several groups. e.g.: special equipment number 56 149/2 can appear in groups 67, 72, 73, 74.
Lamps	It is essential to state the manufacturer for determining headlamp parts, as different manufacturer's parts are not completely interchangeable.
SA (optional equipment) code number	The 3-digit codes for special equipments are written in ascending order in lines. The slash that was used earlier is omitted. Thus, 410 corresponds to 41/0, 466 corresponds to 46/6 etc. The meaning of the special equipment code can be found in the "Code list of special versions - Passenger cars".
Equipment	Code for color and material dependent interior trim.
Paintwork	Color code for the original paintwork, single-colored. In the event of multicolor painting, additional codes are listed in fields 32-35.
Lock system number (not on all vehicle data cards)	The lock system numbers of master and secondary keys are identical. Differentiating characteristic H=master key, N=secondary key. The lock system number has to be specified when ordering spare keys or locks for certain vehicles in order to sustain a consistent closing system.

KEY TO BODY PLATE - AH00.00-P-4000-01A

Model 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210



P82.61-2542-01

Fig. 5: Identifying Key To Body Plate

i The body plate is screwed onto the cross member above the radiator. The layout differs from one plant to another, however, always contains the same data.

GENERAL NOTES: PASSENGER CARS: OVERALL VEHICLE - AH00.00-Z-9999AZ

MODEL all

	Notes of position of chassis number	MODEL 452.3 /4	AH00.00-P-0002-01RR
(!)	Notes on avoiding damage through contamination and foreign objects	MODEL all	AH00.00-P-5000-01A
(!)	Notes on bolted connections with self tapping screws	MODEL all	AH00.00-P-0007-01SF
i	Chassis number breakdown	MODEL 452	AH00.00-P-2000-01RR
(!)	Measures for preventing damage to vehicles or components when performing arc welding work	MODEL 452.3 /4	AH00.00-P-0005-01RC
i	Notes on bolted connections with self tapping screws	MODEL 452.3 /4	AH00.00-P-0007-01RR
i	Notes on position of chassis number	MODEL 454.0	AH00.00-P-0002-01FF
i	Notes of position of chassis number	MODEL 450.3 /4	AH00.00-P-0002-01SM
i	Notes on water entry - Convertible	MODEL 450.4	AH00.00-P-0004-01SM
i	Notes on bolted	MODEL 450.3 /4	AH00.00-P-0007-

	connections with self tapping screws		01SM
i	Key to chassis number	MODEL 107 as of 1.8.83, 124, 126 as of 1.8.83, 129, 140, 201, 202, 210	AH00.00-P-2000-01A
i	Chassis number breakdown	MODEL 163.113/128 /136 /154 /172 /174 /175	**AH00.00-P-2000-01GH**
i	Chassis number breakdown	MODEL 450	AH00.00-P-2000-01SM
i	Chassis number breakdown	MODEL 463.249 /246 /271	AH00.00-P-2000-01U
i	Layout of vehicle data card	MODEL 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123 from 01.01.60 until 31.12.77	AH00.00-P-3000-01A
i	Layout of vehicle data card	MODEL 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210, 215, 220 ab 01.01.78	**AH00.00-P-3000-01B**
i	Key to body plate	MODEL 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210...	**AH00.00-P-4000-01A**
i	Conversion measures resulting in alteration to vehicle model	MODEL 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210...	**AH00.10-P-1000-01A**
i	Converting vehicles to operate on liquefied petroleum gas	MODEL 123.220 /280, 124.020 /080, 126.021, 201.023	AH00.10-P-1000-02A
i	Notes on performance correction	ENGINE 104, 111, 112, 113, 119, 120, 137, 166, 601, 602, 603, 604, 605, 606 ...	**AH00.10-P-2010-01A**
i	Correction tables for calculating actual performance value	ENGINE 104, 111, 112, 113, 119, 120, 137, 166, 601, 602, 603, 604, 605, 606 ...	**AH00.10-P-2010-02A**
i	Notes on replacing safety-relevant components	MODEL all	**AH00.19-P-1000-02A**
i	Advantages of repairing wiring harnesses	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AH00.19-P-1000-03A**
i	Advantages of repairing wiring harnesses	MODEL 452.3 /4	AH00.19-P-1000-03RC
i	Advantages of repairing wiring harnesses	MODEL 450.3 /4, 454.0	AH00.19-P-1000-03SM

i	Repair methods for wiring harnesses	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463 ...	**AH00.19-P-1000-04A**
i	Methods for repairing wiring harnesses	MODEL 452.3 /4	AH00.19-P-1000-04RC
i	Repair methods for wiring harnesses	MODEL 450.3 /4, 454.0	AH00.19-P-1000-04SM
i	Notes regarding plug connections	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463 ...	**AH00.19-P-1000-06A**
i	Notes on soft soldering	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463 ...	**AH00.19-P-1000-07A**
i	Notes on crimping	MODEL 452.3 /4 Crimp- and Stripping Pliers	AH00.19-P-1000-09RC
i	Notes on crimping	MODEL 450.3 /4, 454.0 Crimp- and Stripping Pliers	AH00.19-P-1000-09SM
i	Notes on soldering	MODEL 450.3 /4	AH00.19-P-1000-10SM
i	Notes on cable protection	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463 ...	**AH00.19-P-1000-11A**
i	Notes on stripping wires	MODEL 452.3 /4 Crimp- and Stripping Pliers	AH00.19-P-1000-12RC
i	Notes on stripping wires	MODEL 452.3 /4 Stripping Pliers	AH00.19-P-1000-12RR
i	Notes on stripping wires	MODEL 450.3 /4, 454.0 Crimp- and Stripping Pliers	AH00.19-P-1000-12SM
i	Notes on stripping wires	MODEL 450.3 /4, 454.0 Stripping Pliers	AH00.19-P-1000-12SN
!	Notes on self-locking nuts and bolts	MODEL all	**AH00.00-N-0001-01A**
!	Measures for preventing damage to vehicles or components when performing arc welding work	MODEL 450.3 /4	AH00.00-P-0005-01SM

ⓘ	Information on function and performance test on roller dynamometer	MODEL 460, 461, 463 ...	AH00.10-P-1000-03A
ⓘ	Measures for preventing damage to vehicles or components when performing arc welding work	MODEL all	**AH00.00-N-0005-01A**
ⓘ	Measures for preventing damage to vehicles or components when performing electric welding work	MODEL 451.3/4, 454.0	AH00.00-P-0005-01FF
ⓘ	Notes on thread repairs	MODEL 452.3 /4	AH00.00-P-0008-01RR
ⓘ	Notes on thread repairs	MODEL 450.3 /4	AH00.00-P-0008-01SM
ⓘ	Notes on removing glue residues and foils on paint and metal surfaces with eraser disc	MODEL 169.0 /3, 216.3, 219.3, 221.0/1, 245.2	AH00.00-P-0013-01AK
ⓘ	Assessment of damage in wiring harnesses	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AH00.19-P-1000-05A**
ⓘ	Assessment of damage to cable harnesses	MODEL 452.3 /4	AH00.19-P-1000-05RC
ⓘ	Assessment of damage in wiring harnesses	MODEL 450.3 /4, 454.0	AH00.19-P-1000-05SM
ⓘ	Notes on replacement of safety-relevant and special components	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AH00.19-P-1000-08A**
ⓘ	Notes on crimping	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AH00.19-P-1000-09A**
ⓘ	Notes on soldering	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AH00.19-P-1000-10A**

	Notes on Towing	MODEL 461, 463	AH00.60-P-0100-02GA

GENERAL NOTES: PASSENGER CARS - AH00.01-Z-0998AZ

MODEL all

Overall vehicle			
	Overall vehicle	FG00	**AH00.00-Z-9999AZ**
Engine			
	Complete engine, crankcase ventilation, cylinder head, crankcase	FG01	**AH01.00-Z-9999AZ**
	Crank assembly	FG03	**AH03.00-Z-9999AZ**
	Engine timing	FG05	**AH05.00-Z-9999AZ**
	Mixture formation	FG07	**AH07.00-Z-9999AZ**
	Air intake, supercharging	FG09	AH09.00-Z-9999AZ
	Electrical system - engine	FG15	**AH15.00-Z-9999AZ**
	Engine lubrication, engine oil cooling	FG18	**AH18.00-Z-9999AZ**
	Engine cooling system	FG20	**AH20.00-Z-9999AZ**
	Engine suspension	FG22	AH22.00-Z-9999AZ
	Throttle control, cruise control system	FG30	AH30.00-Z-9999AZ
	Fuel system	FG47	AH47.00-Z-9999AZ
	Exhaust system	FG49	**AH49.00-Z-9999AZ**
Chassis			
	Manual transmission	FG26	AH26.00-Z-9999AZ
	Automatic transmission	FG27	AH27.00-Z-9999AZ
	Frame, trailer operation	FG31	**AH31.00-Z-9999AZ**
	Suspension	FG32	**AH32.00-Z-9999AZ**
	Rear axle	FG35	AH35.00-Z-9999AZ
	Wheels, chassis alignment check	FG40	**AH40.00-Z-9999AZ**
	Brakes - hydraulic and mechanical systems	FG42	**AH42.00-Z-9999AZ**
	Brakes - pneumatic system and auxiliary brakes	FG43	AH43.00-Z-9999AZ
	Steering	FG46	**AH46.00-Z-9999AZ**
	Electrical system, equipment and instruments	FG54	**AH54.00-Z-9999AZ**

Body			
	Body - general	FG60	**AH60.00-Z-9999AZ**
	Front end and fire wall	FG62	**AH62.00-Z-9999AZ**
	Side wall	FG63	AH63.00-Z-9999AZ
	Rear wall and rear end	FG64	AH64.00-Z-9999AZ
	Roof	FG65	AH65.00-Z-9999AZ
	Windows	FG67	AH67.00-Z-9999AZ
	Interior equipment	FG68	**AH68.00-Z-9999AZ**
	Doors	FG72	AH72.00-Z-9999AZ
	Sliding roof, soft top, top attachments	FG77	AH77.00-Z-9999AZ
	Central locking, convenience feature, drive authorization system	FG80	AH80.00-Z-9999AZ
	Electrical system body	FG82	**AH82.00-Z-9999AZ**
	Climate control	FG83	**AH83.00-Z-9999AZ**
	Emergency equipment, sanitary equipment, galley	FG86	AH86.00-Z-9999AZ
	Detachable body components, exterior flaps	FG88	AH88.00-Z-9999AZ
	Seats, bunks, restraint systems	FG91	**AH91.00-Z-9999AZ**
	Body sealing, corrosion protection	FG97	**AH97.00-Z-9999AZ**
	Paintwork	FG98	**AH98.00-Z-9999AZ**

CONVERSION MEASURES RESULTING IN ALTERATION TO VEHICLE MODEL - AH00.10-P-1000-01A

Model 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210

We disapprove of all vehicle conversions resulting in an alteration to the model. A standard production vehicle is a design entity which, upon installation of parts alien to the model, usually changes in a detrimental way. Changes to important components influence the homogeneity of the vehicle in its entirety. For this reason we have not investigated the details to be observed when performing such conversions. Such conversions can also lead to changes on the vehicle which require new proof that the vehicle complies with legal requirements.

The main reasons for our disapproval are:

1. Subsequent installation of a component such as a more powerful engine may overload the remaining components such as the transmission, brakes, axles, etc.

2. Changes to the standard condition may decisively influence the new vehicle warranty, since our warranty obligation does not cover damage resulting from a change to the original Daimler Benz delivery condition.
3. Proper supply of parts is no longer ensured when major components are replaced.
4. The exchange procedure is based on the "Identical unit exchange" principle. For example, an identical model reconditioned unit will be supplied in return for a damaged engine. Only then is it possible to be credited for the returned damaged engine.

NOTE: In addition, vehicles registered in the Federal Republic of Germany are subject to the law which revokes the operating permit as a result of conversions which change the model. We cannot issue a Certificate of non-objection for individual approval by the technical motor vehicle testing authority in each case.

Customer inquiries and requests of this type should be answered along these lines in order to ensure that the quality standard of our vehicles is not impaired.

NOTES ON PERFORMANCE CORRECTION - AH00.10-P-2010-01A

Engine 104, 111, 112, 113, 119, 120, 137, 166, 601, 602, 603, 604, 605, 606

General

The weather station's barometer must be calibrated to the air pressure specified by the local meteorological office.

The measured performance value must be corrected with correction factors.

There are two 2 correction factors:

- Altitude correction factor
- Performance correction factor

Performance correction formula $N_{eo} = N_e \times K_H$

N_{eo} = Performance in reference to normal operating conditions in kW.

N_e = Performance measured on the output dynamometer in kW.

K_H = Correction for intake air temperature, barometer level and altitude of the relevant test location.

Calculation example

1. Read air pressure, altitude and intake air temperature of the test location off at the weather station.

In the example:

Air pressure of the test location =955 hPa (mbar)

Altitude of the test location = 400 m

Intake air temperature of the test location =+20°C

2. Determine the performance on the output dynamometer =100 kW
3. In the altitude correction Table, the altitude value of the test location = 400 m, results in a height correction factor of 46 hPa (mbar).
4. The air pressure of the test location minus the height correction factor results in an air pressure value (p) of:

   955 hPa (mbar) - 46 hPa (mbar) = 909 hPa (mbar)

   In order to be able to insert the air pressure (p) into the Table, it must be rounded. In the example, to 910 hPa.

5. On the basis of the air pressure (p) = 910 hPa, we read a correction factor (KH) of 1.0787 off from the performance correction Table with an intake air temperature (t) of 20°C.
6. The performance data in relation to normal operating conditions results in the following:

   $N_{eo} = N_e \times K_H$

   N_{eo} = 100 kW x 1.0787 = 108 kW

Output on the dynamometer: Ne = 100 kW

Air pressure value of the test location: P= 955 hPa (955 mbar)

Air-charge temperature of the test location: t =+20°C

Altitude of the test location: 400 m above sea level

Units: hPa = Hecto Pascal

1 hPa = 1 mbar

1 Pa = 0.01 mbar

CORRECTION TABLES FOR CALCULATING ACTUAL PERFORMANCE VALUE - AH00.10-P-2010-02A

Engine 104, 111, 112, 113, 119, 120, 137, 166, 601, 602, 603, 604, 605, 606

Performance correction formula $N_{eo} = N_e \times K_H$

N_{eo} = Performance in reference to normal operating conditions (sea level, temperature 25°C) in kW.

N_e = Performance measured on the output dynamometer in kW.

K_H = Correction factor n

Correction factor (K_H): n

- Determine air pressure and altitude of the test location
- Use subsequent altitude correction Table to correct air pressure
- Determine air-charge temperature.
- Using these values and the subsequent performance correction Table read off the correction factor (K_H)

Altitude correction

If the air pressure is read off in relation to the sea level (weather station), the following air pressure in the correction Table must be subtracted.

m	hPa	m	hPa	m	hPa	m	hPa	m	hPa
0	0	300	36	600	69	900	104	2000	221
50	6	350	41	6350	75	950	109	2100	230
100	12	400	46	700	81	1000	115	2200	239
150	18	450	52	750	86	1100	126	2300	250
200	24	500	58	800	92	1200	137	2400	259
250	30	550	63	850	98	1300	148	2500	268

Performance correction Table

hPa (mbar)	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C
1040	0.9111	0.9194	0.9277	0.9358	0.9	0.9	0.99	0.9678	0.9756	0.9833	0.9910
1035	0.9155	0.9239	0.9321	0.9403	0.9645	0.9565	0.9645	0.9724	0.9803	0.9881	0.9958
1030	0.9200	0.9284	0.9367	0.9449	0.9531	0.992	0.992	0.9772	0.99291	0.9929	1.0007
1025	0.9245	0.9329	0.9412	0.9495	0.9577	0.9899	0.9	0.9899	0.99	0.9977	1.0056
1020	0.9290	0.9375	0.9458	0.9542	0.9624	1.0026	0.9947	0.9947	0.9947	1.0026	1.0105
1015	0.9336	0.9421	0.9505	0.999	0.9672	0.9754	0.9835	0.9916	0.9996	1.0076	1.0155
1010	0.9382	0.9467	0.9552	0.9636	0.9	0.9552	0.9884	0.95	1.0126	1.0126	1.0205
1005	0.9428	0.9514	0.9600	0.9684	0.9768	0.951	0.9933	1.0015	6000.96	1.0176	1.0256
1000	0.9476	0.9562	0.9648	0.9732	0.9817	0.96480	0.973	1.0065	1.0146	1.0227	1.0307
995	0.9523	0.9610	0.96100.96	02781	0.9866	0.9950	1.0033	1.0115	1.0197	1.0278	1.0359

990	0.9571	0.9659	0.9745	0.9831	1.0166	1.0000	1.0084	1.0166	1.0249	1.0330	1.0411
985	0.9620	0.9708	0.9795	0.9881	0.9966	1.0051	1.0135	1.0218	1.03831	1.0383	1.0464
900	0.9669	0.9757	0.9845	0.9931	1.0017	1.0102	1.0186	1.0	1.0353	1.0436	1.0517
975	0.9719	0.9807	0.9895	0.9982	1.0068	1.0154	1.0239	1.0323	1.0406	1.0489	1.0571
970	0.9769	0.9858	0.9946	1.0033	1.0120	1.0206	1.04601	1.06	1.0460	1.0543	1.0626
965	0.9819	0.98190.9	0.9998	1.0085	1.0173	1.0259	1.0345	1.0430	1.0514	1.0598	1.0681
960	0.9870	0.9960	1.0050	1.0138	1.0226	1.0736	1.0399	1.0484	1.0569	1.0653	1.0736
955	0.9922	1.0013	1.0102	1.07091	1.0279	1.0366	1.0453	1.0539	1.070	1.0793	1.0793
950	0.9974	1.0065	1.0155	1.0245	1.0333	1.07651	1.0508	1.0849	1.024	1.0765	1.0849
945	1.0027	1.0119	1.09	1.0209	1.0388	1.0476	1.0564	1.08221	1.0907	1.0822	1.0907
940	1.0080	1.0172	1.0263	1.044	1.0443	1.0532	1.05321.0	1.07	1.0794	1.0880	1.0965
935	1.0134	1.0227	1.0318	1.09	1.049	1.0588	1.0677	1.0764	1.1	1.0938	1.1023
930	1.0189	1.0282	1.0374	1.0555	1.055	1.0645	1.0734	1.0822	1.01891.0	1.0997	1.1083
925	1.0244	1.0337	1.03371.0	1.0522	1.0613	1.043	1.0792	1.10561	1.0969	1.1056	1.1143
920	1.0300	1.0393	1.0487	1.0579	1.10	1.06701	1.05791	1.0940	1.1028	1.1116	1.1203
915	1.0356	1.0450	1.054	1.0637	1.0729	1.1000	1.10	1.10	1.1089	1.1177	1.1264
910	1.0413	1.0508	1.0602	1.0695	1.0787	1.0879	1.07871.0	1.1150	1.1150	1.1238	1.1326
905	1.0470	1.0566	1.05661.0	1.0754	1.0847	1.0939	1.1	1.1	1.1	1.1300	1.1389
900	1.0528	1.0624	1.0720	1.0624	1.0907	1.10	1.1452	1.1363	1.1363	1.1363	1.1452
895	1.0587	1.0684	1.0779	1.0684	1.0968	1.06841	1.1154	1.1246	1.1336	1.1427	1.1516
890	1.0647	1.0744	1.0840	1.0935	1.10	1.1124	1.1217	1.1309	1.1400	1.1581	1.1581
885	1.0707	1.0805	1.0901	1.0997	1.1092	1.1186	1.1280	1.1373	1.1465	1.1646	1.1646
880	1.0768	1.0855	1.0963	1.10	1.1155	1.1250	1.1344	1.1437	1.1530	1.1712	1.1712
875	1.0829	1.0928	1.1026	1.1123	1.1219	1.1314	1.1409	1.1503	1.1596	1.1688	1.1779
870	1.0892	1.0991	1.1089	1.1847	1.1283	1.1379	1.1474	1.1569	1.1662	1.1755	1.1847
865	1.0954	1.1054	1.1153	1.1251	1.1349	1.1445	1.10541	1.1636	1.1730	1.1823	1.1915
860	1.1018	1.19	1.1985	1.1317	1.1415	1.1512	1.1608	1.1703	1.1798	1.1892	1.1985
855	1.1083	1.1184	1.1284	1.1383	1.12841	1.1579	1.1676	1.1772	1.1867	1.1961	1.2055
850	1.1148	1.1249	1.1350	1.1350	1.1549	1.1647	1.1744	1.12491	1.1937	1.2126	1.2126
845	1.1214	1.1316	1.1417	1.1518	1.1417	1.1716	1.1814	1.21	1.2007	1.2103	1.2198
840	1.1281	1.1383	1.1485	1.1786	1.1686	1.1786	1.1884	1.2	1.2079	1.2175	1.2270
835	1.1348	1.1452	1.1554	1.1656	1.1756	1.1856	1.1955	1.2344	1.22481	1.2248	1.2344
830	1.1416	1.1521	1.1624	1.1726	1.1827	1.1928	1.2027	1.2126	1.2224	1.2321	1.2418
825	1.1486	1.1590	1.1694	1.1797	1.169	1.2000	1.2100	1.2200	1.2298	1.2396	1.2493
820	1.1556	1.1661	1.1765	1.1869	1.1971	11.2073	1.2174	1.2174	1.2373	1.2472	1.2569
815	1.1627	1.1733	1.1838	1.2	1.2045	1.2147	1.2249	1.2349	1.2449	1.2548	1.2647
810	1.1698	1.1805	1.16981.1	1.2015	1.2119	1.22	1.2324	1.2426	1.2626	1.2626	1.2725
805	1.1771	1.1878	1.1985	1.2090	1.2195	1.2298	1.27041	1.2503	1.2604	1.2704	1.2804
800	1.1845	1.1953	1.2060	1.2166	1.27841	11.2375	1.2884	1.27841	1.2683	1.2784	1.2884
795	1.1920	1.2028	1.2135	1.28641.2	1.2348	1.2453	1.2557	1.2660	1.28641.2	1.2864	1.2956
790	1.1994	1.3047	1.2	1.2320	1.2636	1.28431.2	1.26	1.2740	1.2843	1.2945	1.3047

	1.2071	1.2181	1.2290	1.2398	1.2505	1.30281	1.2717	1.22901	1.2925	1.3028	1.3130
780	1.2148	1.2259	1.2369	1.2478	1.2585	1.23691.2	1.2798	1.2904	1.3008	1.3214	1.3214

NOTES ON REPLACING SAFETY - RELEVANT COMPONENTS - AH00.19-P-1000-02A

General

With the approval of repair solutions for wiring harnesses (in particular airbag, side airbag, window airbag, emergency tensioning retractor wiring harness), it is necessary to introduce a modified ordering routine for procuring safety-relevant components. The order formalities are by and large the same as those which are already familiar from theft-relevant components.

Procedure

It is only possible to order safety-relevant components by stating the vehicle ident number (refer parts order note on the parts microfiche).

The repair orders and invoices should be filed in the usual way.

All orders received for safety-relevant components are additionally automatically documented in Fdok.

ADVANTAGES OF REPAIRING WIRING HARNESSES - AH00.19-P-1000-03A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Advantages of repairing wiring harnesses

- Wiring harnesses are essentially repaired to reduce repair costs.
- If repairs are carried out properly, there is no difference in function or quality between the repaired wiring harness and a brand new wiring harness.
- Repairing wiring harnesses helps to save resources.
- This also complies with the "Technical Alliance Center" requirements for less dismantling and installation cost.

REPAIR METHODS FOR WIRING HARNESSES - AH00.19-P-1000-04A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Repair method summary

The following methods have been approved by DaimlerChrysler for repairing wiring harnesses in Mercedes-Benz passenger cars:

Repair methods:

- Crimping
- Solder connection (Raychem)
- Axial solder connection (Raychem)
- Combination of Raychem and cable tail
- Soldering
- Insulation displacement method
- Flat conductor pliers

Application

Individual cases must be analyzed in detail to decide which method can and cannot be used to repair wiring harnesses (wires, contacts and connectors).

Crimping repair method

In crimping, the insulation is first stripped off an appropriate distance (a) from the end of the wire. Then the contact pin is placed over the stripped end of the wire and pinched ("crimped") in place by means of a special pliers-like crimping tool. Crimping is performed quickly and with ease. A special crimper is required.

i Only lines up to 4 mm^2 shall be crimped.

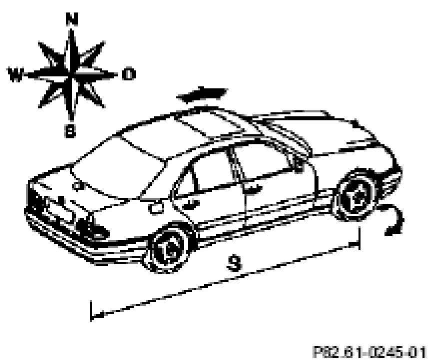


Fig. 6: Identifying Crimping Repair Method

Raychem repair method

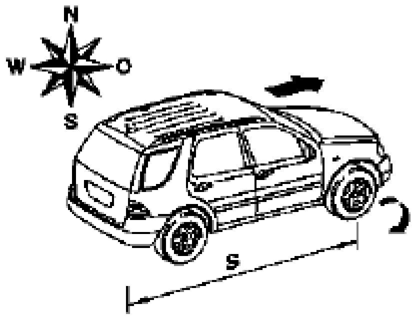
With this method, special solder connectors are used. The solder connections contain the solder and they also feature insulation and a seal. A special hot air blower provides the heat required for soldering and shrinking the insulation. A special reflector is fitted to the hot air blower. The minimum temperature for this repair method is 400°C.

i Raychem is the manufacturer of the solder connections that are required for this method. The Raychem repair method is mainly used for integrating repair wiring harnesses (cable tails): ?

Combination of Raychem repair method and cable tail repair

Cable tails are prefabricated partial wiring harness kits available as Mercedes-Benz replacement parts. They have the appropriate cable cross-sections and crimped contacts. The Raychem repair method is used to integrate the cable tails into the wiring harnesses.

i Only use cable tails for lines between 4 and 10 mm^2 . Starting at 10 mm^2 the wiring harnesses must be replaced.

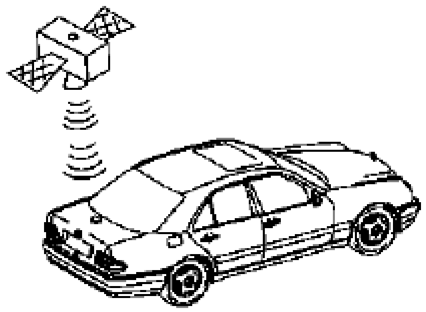


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Fig. 7: Identifying Raychem Repair Method

Soldering repair method

The strands of the cable (2) are soldered in the solder contact (axial or radial version) (1) using a soldering iron. Commercially available solder is used for the soldered connection. This method is only used for repairing plug connections.



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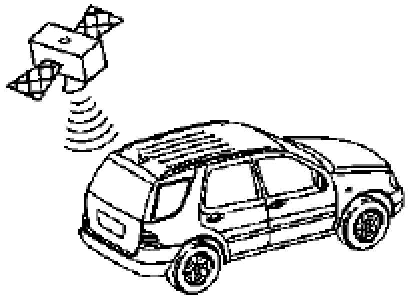
Fig. 8: Identifying Soldering Repair Method

Repair method using rapid connection technology

This method uses special rapid-connection wire connector blocks. Mercedes-Benz permits the 2-, 4-, and 6-pin versions. They contain tin-plated rapid connection contacts, which are pressed together to touch the wires of the cables using pliers. The lines do not have to be separated or stripped.

This method can be used for connection to cables with a cross section of 0.35 to 0.75 mm ^{2} and for wire end connections.

[i] The rapid connection method must only be used inside the vehicle or in the trunk because the connection is not watertight. They are not permissible for CAN lines.

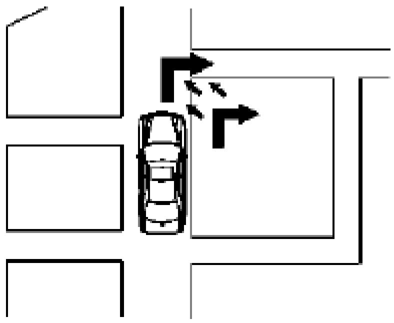


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Fig. 9: Identifying Repair Method Using Rapid Connection Technology

Flat conductor cable repair method

Select crimp contacts in the wiring harness repair kit and insert into the tool head of the open manual crimp pliers (2). The flat conductor cable (7) must make contact with the tool head, and the correct edge of the flat conductor cable (7) must make contact with the adjusting stop (3). The optical adjusting device (4) in the manual crimp pliers (2) must be fully visible between 2 conductor tracks. Press the manual crimp pliers (2) together all the way. After it has been pressed down all the way, it can be opened again. Remove the finished crimp connection.



P82.61-0247-01

Fig. 10: Identifying Flat Conductor Cable Repair Method

Comparison of circular conductor repair methods

	Crimping	**Raychem/cable tail repair method**	**Soldering**	**Rapid connection technology**
Applications	Repair cables Replace damaged contacts Repair connectors Additional line connection	Repair cables Cable extension Integrate repaired cables (cable tails, replacement wires) in the wiring harness	Replace soldered contacts (special applications)	Repair cables Additional line connection Wire end connection

Equipment and tools required	Side cutting pliers Wire stripper Crimper with special die sets	Side cutting pliers Wire stripper Hot air blower with special reflector Raychem connection Cable tails Heat shield mat	Side cutting pliers Wire stripper Soldering iron with accessories Heat shield mat as drip protection	Side cutting pliers Water-pump pliers
Type of contact	clamped	soldered	soldered	clamped
Heat source	None	Hot air gun with special reflector (400°C)	Soldering iron (400°C)	None
Advantages	Quick repair, no mains power connection required Strain relieved by clamping the insulation Simple visual inspection of connection	Insulation occurs automatically Sealing occurs automatically Avoids taut wires by introducing additional wires	Replace soldered contacts (special applications)	No wire stripping or cutting required Relatively short set-up time No special tool required
Disadvantages	Special crimping components required	Mains power connection required Accessibility for hot air gun must be ensured Measures for heat protection required	Extensive preparation and post-working required	No watertight versions, therefore only suitable for use inside the vehicle or in the trunk area Use limited to certain cable cross-sections Not permissible for CAN lines

ASSESSMENT OF DAMAGE IN WIRING HARNESSES - AH00.19-P-1000-05A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Always assess the damage thoroughly before repairing the wiring harnesses.

The following criteria must be observed:

Type of damage:

- Damage caused by scorching/overheating, chafing, clamping, crushing, severing, fatigue, corrosion, cable chewed by an animal, assembly fault.

Cause of damage:

- The cause for the damage must be determined to ensure that the damage does not reoccur after the wiring harness has been repaired.

Scope of the damage:

- Which components are damaged, can the damage be identified exactly?
- Can you be sure that no other components are damaged?

Repair options:

- What are the options for repair?
- Which replacement parts are available?

Overview of causes for damage to wiring harnesses

Type of damage:	Possible causes for damage	Possible scope of damage
Scorching/ overheating	• Through external overheating: Through contact with hot components (e.g. exhaust system), during welding and soldering, painting and drying work • Fire • Internal overheating because electric currents are too high: Short circuits at defective components or lines, cable cross-section too small, incorrect fusing (parts not installed correctly or repairs not carried out correctly), short circuits due to bridging (e.g. at wire ends that are not insulated, if insulation is damaged)	• Insulation and wires damaged • Connector housing deformed • Open circuit in wiring • Insulated hard and cracked
Chafing, clamping, crushing, severing	• Lines routed or secured incorrectly • Damage as a result of an accident • Damage to cable when boring holes or when screwing sheet metal screws	• Insulation and wires damaged • Lines or connections to contacts • High line resistance • Short circuit to ground and power

	into the body • Lines get pinched in clamps or trim parts	
Fatigue	• Lines routed or secured incorrectly • Excessive stress	• Open circuit in wiring
Corrosion	• Due to contact with acids or aggressive fluids (e.g. brake fluid, antiseize, coolant additives, fuels, lubricants), water penetration due to defective seals, use of high pressure cleaner • Wiring harness covered in paint after paint repair • Hardening of insulation due to contact with an incompatible agent (e.g. solvent)	• Line open circuit, contact pairing not longer conductive (transition resistances) • Insulation and wires damaged • Lines or connections to contacts • High line resistance • Components with sharp edges • Corrosion
Assembly fault	• Use of incorrect tools, e.g. wrong crimper or wrong release tool • Damaged contacts or lines through use of unsuitable test tools (e.g. probes) • Lines pinched or screwed in	• Loose contacts in plug connections • Wrong contacts crimped • Undesirable transition resistances • Open circuit in wiring, short-circuit • Insulation damaged

Overview of authorized reworking on wiring harnesses

Type of fault	Remedial action
Faulty contact part	
Contact part ○ missing ○ wrong part ○ deformed	• Install new contact part
Contact part not engaged properly	• Latch contact part, then check, and replace if necessary
Not all individual wires are crimped	• Cut off contact part and install new part
Insulation also crimped	• Cut off contact part and install new part
Conductor not far enough in contact part	• Cut off contact part and install new part

Contact part not tin-plated	• Cut off contact part and install new part
Sleeve ◦ oxidized ◦ wrong part	• Cut off contact part and install new part
Not soldered properly/dry solder joint	• Resolder contact part and replace if necessary
Plug-in area full of solder	• Cut off contact part and install new part
Fault with housing	
Screw connections loose	• Tighten screw connections using an adjusted torque wrench, replace if necessary
Screw connections ◦ wrong part ◦ damaged	• Install new screw connections (cable connectors)
Coupling housing or plug housing damaged	• Install new coupling or housing • Check contact and replace if necessary
Coupling housing or connector housing not closed properly	• Close coupling or housing properly
Cap screw in handle recess ◦ missing ◦ loose	• Tighten cap screw, replace if necessary
Cable fault	
Insulating tubing damaged	• Rewrap with PVC tape
Insulation damaged	• Cut through affected line at damaged area and repair using Raychem repair method
Insulation pulled up	• Cut through affected line at damaged area and repair using Raychem repair method
Wrapping defective	• Rewrap
Splashes of solder on cable	• Carefully remove splashes of solder using a suitable tool without sharp edges.
Grommet ◦ missing ◦ wrong part ◦ installed incorrectly ◦ damaged	• Pull on new grommet, or install correctly

NOTES REGARDING PLUG CONNECTIONS - AH00.19-P-1000-06A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Terminology of plug connections:

The coupling and the plug form a plug connection. The female contact and the contact pin form the contact pair.

Illustrated: SLK family, coding A (with circular conductor)

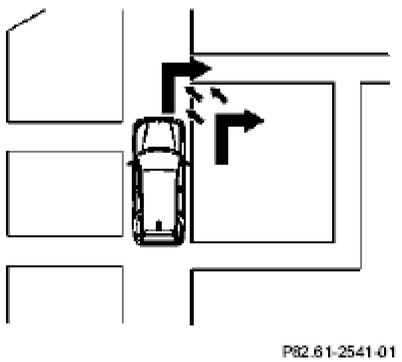


Fig. 11: Identifying Plug Connections - SLK Family, Coding A (With Circular Conductor)

Plugs and couplings

The plugs and couplings are grouped into families in the same way as the contact groups (e.g. SLK, JPT). The type and shape of the receptacle chambers in the housing is the major differentiating characteristic. Different contact families may be installed in the same housing. In addition, different codings (e.g. A, B, C) may exist within the same plug/coupling family.

Codings are special profiles or teeth on the housings of the coupling and the plug, which may be marked in different colors (e.g. black, white, violet).

These ensure that connector pairings can only be made with the same codings.

- Safety and restraint systems (airbag, emergency tensioning retractor, roll bar) have yellow, orange, or red plug connections for easy identification.

Part number assignments

The housings are assigned according to the part numbers on the housings. On housings made up of several components, the number on the external housing is critical. (When ordering, all the individual part numbers must be ascertained.)

This method of identification by means of part numbers can be used when referring to the literature.

Contacts

A distinction is made between the contact pin and the female contact. Each contact pin and each female contact can be clearly assigned to one group or "family" (e.g. SLK, JPT). Within these families distinctions are made according to the cable cross section and whether there is single-strand insulation for watertight connections. The contacts are also distinguished by their coating (tin, gold or silver).

The contacts are fastened to the cables by means of crimping. ?

Crimp connections

These are used to attach the female contacts or contact pins to the cable. Each contact type must be crimped with the aid of specifically assigned die sets using a pair of pliers. Determining factors: contact family, size of cable cross section, with or without single-strand insulation.

i Only lines up to 4 mm shall be crimped.

Unpinning

This requires a release tool appropriate to the contact family in order to remove female contacts and contact pins from plugs and couplings.

On some plugs and couplings the housings must first be disassembled and unlocked (secondary release) according to the instructions before the actual unpinning.

Contact materials

The contacts used in the interior of the vehicle are primarily tin/tin combinations. Those used on the exterior and in the splash zone are generally silver/silver. Safety systems (particularly the airbag) are equipped with gold/gold contacts.

i Only "identical" contact pairings are permitted for repair work.

NOTES ON SOFT SOLDERING - AH00.19-P-1000-07A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

General information

Soft-soldering is a process for creating an inseparable join between two or more metal parts using additional metals (e.g. soldering tin). The solder melting temperature lies below the melting temperature of the metals to be joined and is lower than 450°C.

The connection is created by wetting the joint locations with hot liquid solder, without melting the parts to be joined.

The joining procedure is assisted by using a flux, which releases surface oxides on the parts to be joined, eliminating and preventing surface films (e.g. greases).

Soft soldering materials

The alloy (mainly lead and tin) of the solder determines its melting point and thus the working temperature for the soft soldering process. Additives modify the properties. Silver components improve e.g. the surface and the joining properties.

The identification of the soft solders is according to DIN 1707.

Example:

L-Sn60PbCu2.

This solder consists of 60 % tin (Sn 60), max. 2 % copper

(Cu 2), the remainder is lead (Pb).

The melting point range is between 183°C and 190°C.

In the electrical system/electronic sector for vehicles, fast solders with a melting point range of approx. 180°C to 200°C should used. These solders are available in the form of wires. They have flux from resins dissolved in alcohol (e.g. colophonium) in their hollow center.

Soldering equipment

Soldering equipment with soldering tips that can reach a temperature of 250°C to 300°C are suitable for the repairs specified by DaimlerChrysler. The aim is to use automatic temperature-regulated equipment (e.g. soldering stations).

Preparation, general

- Use suitable work clothing.
- Use safety glasses.
- Use any available soldering fume extractors, aeration.
- Verify clamping devices and work surfaces.
- Clean soldering tips with small wet sponge.
- Protect surrounding working area from heat damage.

Preconditions for soldering

Soldering points must be clean, free of grease and oxides.

NOTES ON REPLACEMENT OF SAFETY-RELEVANT AND SPECIAL COMPONENTS - AH00.19-P-1000-08A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463

i Plugs and couplings. with yellow, orange or red housing colors are reserved for safety and restraint systems (SRS) and roll bars.

i Observe the following when repairing couplings for squibs (SRS systems):

The repair area must be between 100 mm and 1000 mm behind the squib. Cables which have already been repaired are provided with a yellow marking. This is to be applied retroactively to repair lines without color marking.

Carry out the first repair as close to the plug as possible. In the case of subsequent repairs the old soldered connectors should be removed and the new ones should be attached behind them, the wiring harness should be replaced if necessary.

Before cutting through the lines it is absolutely essential to assign the lines to the corresponding pins in accordance with the wiring diagram. Do not mix up the pin assignment.

The line colors of the repair kit may deviate from the original fitting

Screened lines and light plastic-sheathed cable must never be repaired

In general the following applies to cable repair:

If more than ten lines per branch-off line are damaged, the wiring harness module must be replaced.

Overview (lines/contacts)

Lines/contacts (Function)	Scope affected	
	Cable	Contact
Radio antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
Navigation antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
Emergency call system antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
Telephone antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
Radio antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
TV-antenna lines	Exchange wiring harness/line	Exchange wiring harness/line
D2B (fiber optic cable)	Exchange wiring harness/line	Exchange wiring harness/line
MOST (fiber optic cable)	Exchange wiring harness/line	Exchange wiring harness/line
Telephone handset lines	Exchange wiring harness/line	Exchange wiring harness/line
ESP/SBC cables	Exchange wiring harness/line	Exchange wiring harness/line

Overview (lines/contacts to components)

Lines/contacts for the following components	Scope affected	
	Cable	Contact
Airbag control unit coupling	Exchange wiring harness	Exchange wiring harness
Squibs coupling (SRS systems)	Install repair wiring harness	Install repair wiring harness

NOTES ON CRIMPING - AH00.19-P-1000-09A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

1. Check crimped connection for deformation and ensure that the wires fill the crimp tab correctly (cross-section of enclosed wires).

   i **Correct crimped connection (A):**

   The strands of the cable are evenly enclosed.

   The crimp tab is evenly shaped.

   i **Incorrect crimped connection (B):**

   The crimp tab has an incorrect cross-section and is not full enough.

   i **Incorrect crimped connection (C):**

   Individual wire strands are outside the crimp shackle.

   The crimp tab is too full.

   i **Incorrect crimped connection (D):**

   The crimp claws touch the bottom of the crimped fitting.

   The crimp tab is too full.

   The crimp tab is deformed and therefore damaged.

   Shown with circular conductor

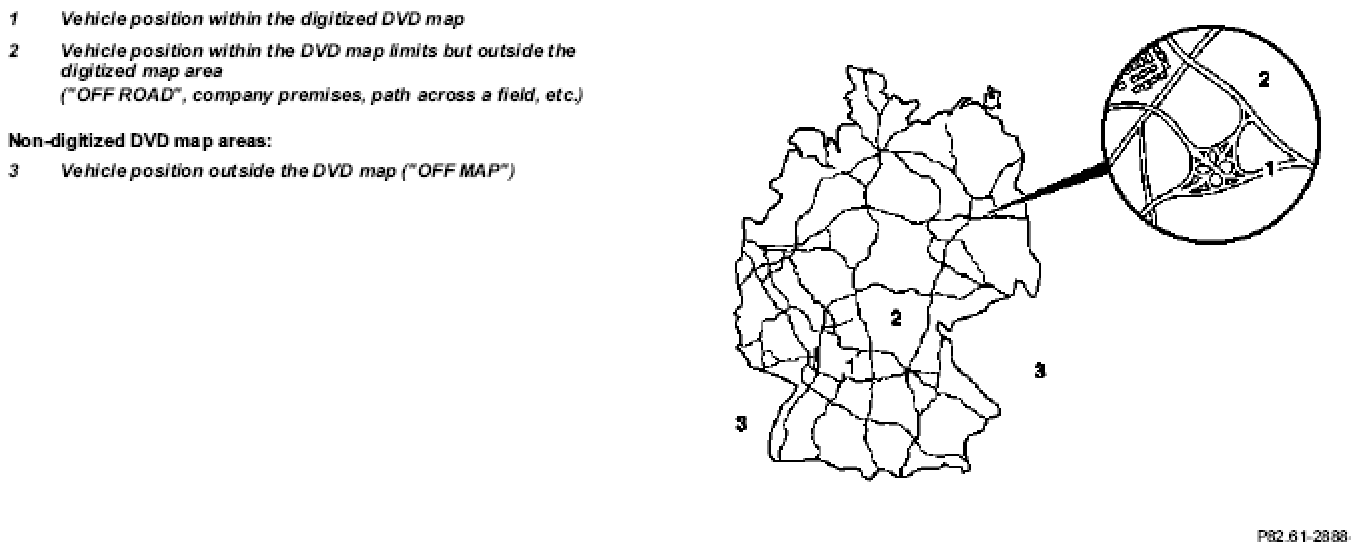


Fig. 12: Cross-Section Of Enclosed Wires - Correct And Incorrect

2. Check crimped connection (ensure all wires are enclosed correctly).

i **Correct crimped connection (A):**

Leads (3) enclosed correctly by the tab (2).

Insulation is enclosed correctly by the tab (1).

i **Incorrect crimped connection (B, C):**

Leads (3) are damaged due to deformed tab (2).

Insulation is pinched by deformed tab (1) and damaged.

Shown with circular conductor

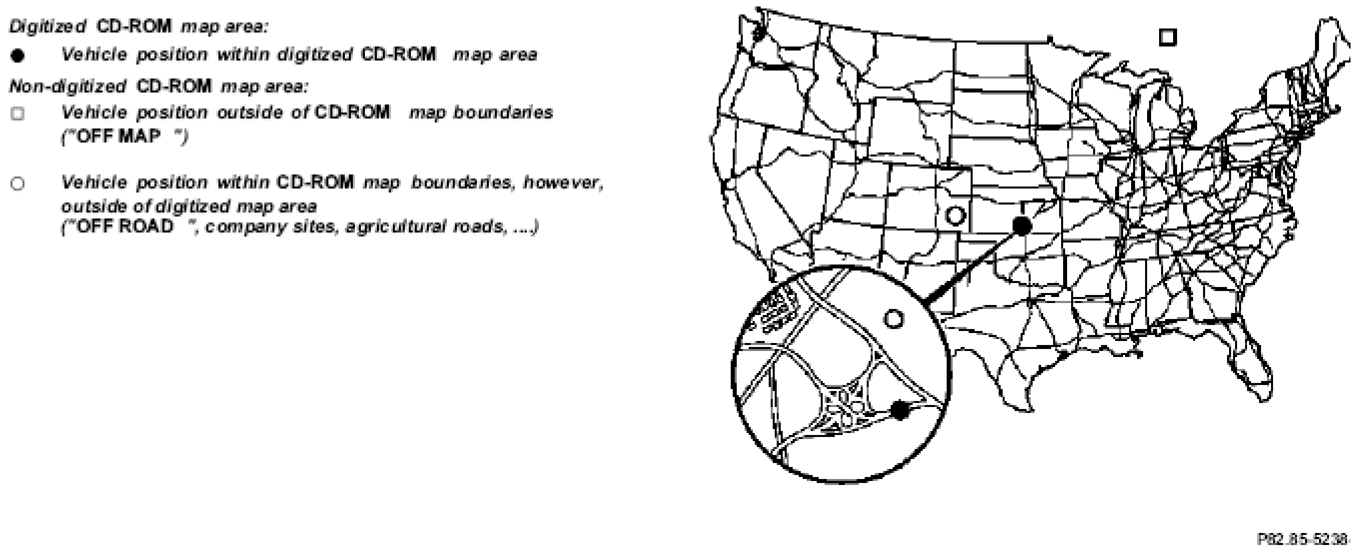


Fig. 13: Identifying Crimped Connection - Correct And Incorrect (1 Of 2)

3. Check crimped connection (ensure that wires and insulation are correct length).

i **Correct crimped connection (A):**

Correct length of insulation is enclosed by the shackle (1).

Wires (3) are the correct length in the tab (2).

i **Incorrect crimped connection (B):**

Insulation is too short and is not correctly enclosed by the tab (1).

Therefore insulation cannot withstand the required tensile load.

i **Incorrect crimped connection (C, D):**

Wire strands (3) are too long.

Leads (3) are too short.

Shown with circular conductor

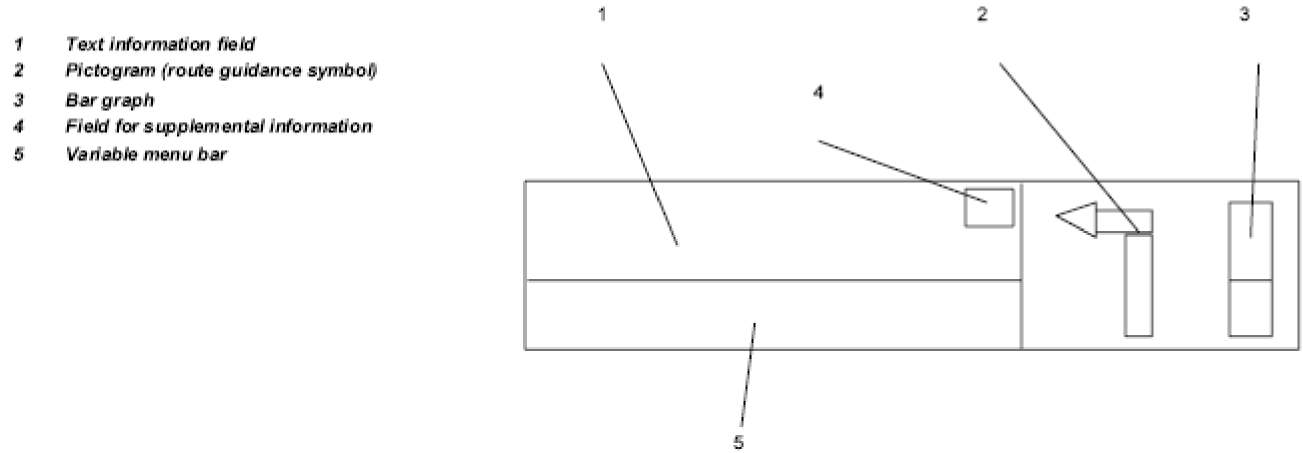


Fig. 14: Identifying Crimped Connection - Correct And Incorrect (2 Of 2)

NOTES ON SOLDERING - AH00.19-P-1000-10A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

ⓘ Evenly heat parts to be joined and solder. Avoid heat-dissipating mounts and brackets. The soldering process lasts between 2 and 4 seconds for the joining of wires and component connections, depending on the cross-section.

The same time must be fixed up to hardening.

Unnecessarily high heating and associated damage to components must be avoided.

During pauses in soldering, it must be ensured that the soldering tip remains adequately tin-plated.

Surface of the soldering join

ⓘ **Correct soldering join (A):**

The solder surface (4) is smooth, shiny, no sharp edges, no interruptions, fluid and free of residues and oxidation.

ⓘ **Incorrect soldering join (B):**

The surface of the solder (4) is matt and uneven, it has sharp-edged ends, interruptions, has not flown, covered with residue.

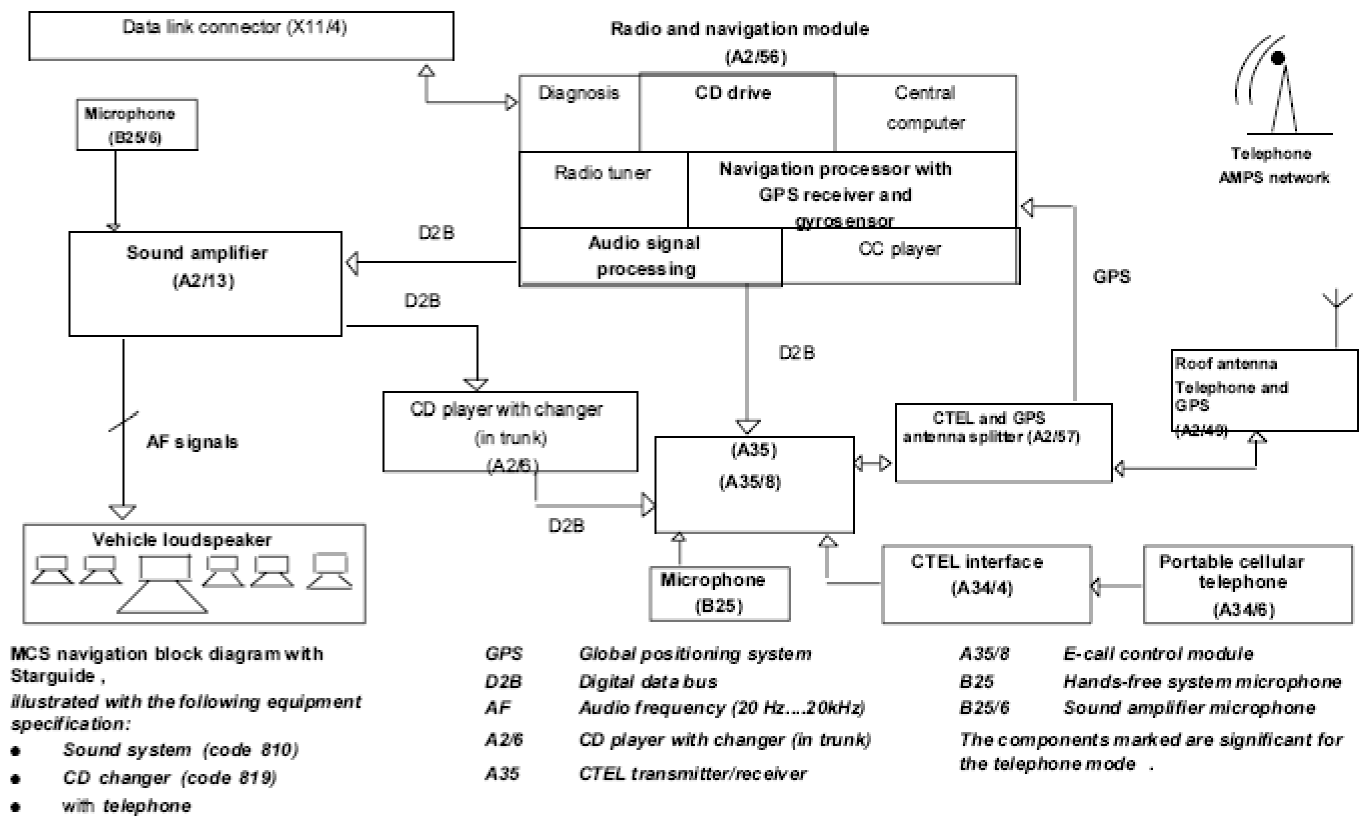


Fig. 15: Identifying Surface Of Soldering Join - Correct And Incorrect

Wire position and contour of soldering join

Correct soldering join (A):

The distance (a) between the solder connector (2) and the line insulation is about 1 mm. The soldered area does not extend beyond the collar of the solder connector (2). Solder flows in a radius in the direction of the line insulation and surrounds at least 2/3 of the lead outside the solder connector (2). There are no bare copper wires visible in the soldering area.

Incorrect soldering joint (B):

If the distance (a) between the solder connector (2) and the line insulation (a) is greater than 2 mm, the line is incorrectly inserted. The solder protrudes beyond the extension line from the collar of the solder connector (b). The solder flows in the wrong direction, the transition from solder to lead is jagged, the solder surface (3) has not flown and is thus a dry solder joint.

A2/56 Radio and navigation unit

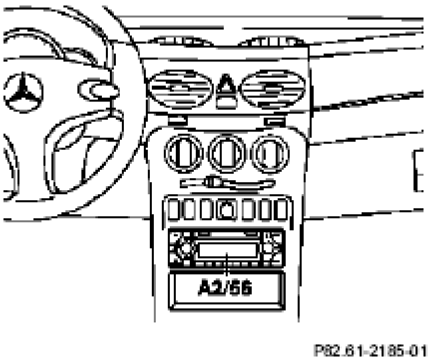


Fig. 16: Identifying Wire Position And Contour Of Soldering Join - Correct And Incorrect

Solder covering and solder quantity for the soldering join

Correct soldering join (A):

The quantity of solder (4) is adequate. Lead of wire (1) is completely surrounded. Solder connector (2) is not covered with solder (4) around the collar.

Incorrect soldering join (B):

The quantity of solder (4) is inadequate. Lead of wire (1) is not completely surrounded. Single wires are not incorporated by the solder (4).

A2/56 Radio and navigation module

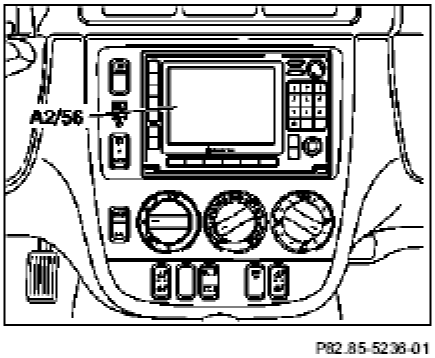


Fig. 17: Identifying Solder Covering And Solder Quantity For Soldering Join - Correct And Incorrect

NOTES ON CABLE PROTECTION - AH00.19-P-1000-11A

Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

General

An attempt should be made to restore the cable protection to its original condition after all repairs to wiring harnesses.

In areas exposed to particularly high stresses (dampness, scouring), additional safety precautions may however be required.

The following measures are recommended depending on the application.

Protect repair area using:

- Heat-shrinkable tube
- Corrugated tube
- Wrapping with fabric tape
- Spaghetti insulation

BASIC KNOWLEDGE

MODEL SURVEY - GF00.10-P-0025-01I

163.1	163.11	163.113	ML 270 CDI
	163.12	163.128	ML 400 CDI
	163.13	163.136	ML 230
	163.15	163.154	ML 320
		163.157	ML 350
	163.17	163.172	ML 430
		163.174	ML 55 AMG
		163.175	ML 500

MAJOR ASSEMBLY OVERVIEW - GF00.10-P-0025-02I

Sales designation	Model	Engine	Manual transmission	Automatic transmission	Steering gear
ML 270 CDI	163.113	612.963	716.644	722.661	-
ML400CDI	163.128	628.963	-	722.666 722.673	-
ML 230	163.136	111.977	717.461	722.660	-
ML 320	163.154	112.942	-	722.662	-
ML 350	163.157	112.970	-	722.674	-
ML 430	163.172	113.942	-	722.663	-
ML 55 AMG	163.174	113.981	-	722.666	-
ML 500	163.175	113.965	-	722.666	-

COMPLETE VEHICLE, MODEL/COMPONENT INSTALLATION SURVEY, BUILD CONDITION - GF00.10-P-0801I

MODEL 163

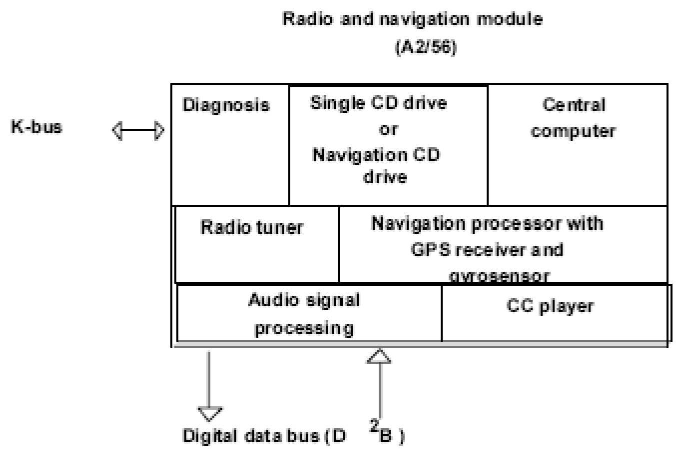


Fig. 18: Identifying Complete Vehicle

	Component survey	Model 163	**GF00.10-P-0025-02I**
	Model survey	Model 163	**GF00.10-P-0025-01I**

FEMALE CONTACTS AND CONTACT PINS, INSTALLATION SURVEY, AS-BUILT CONFIGURATION - GF00.19-P-7000A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

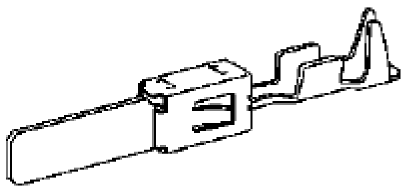
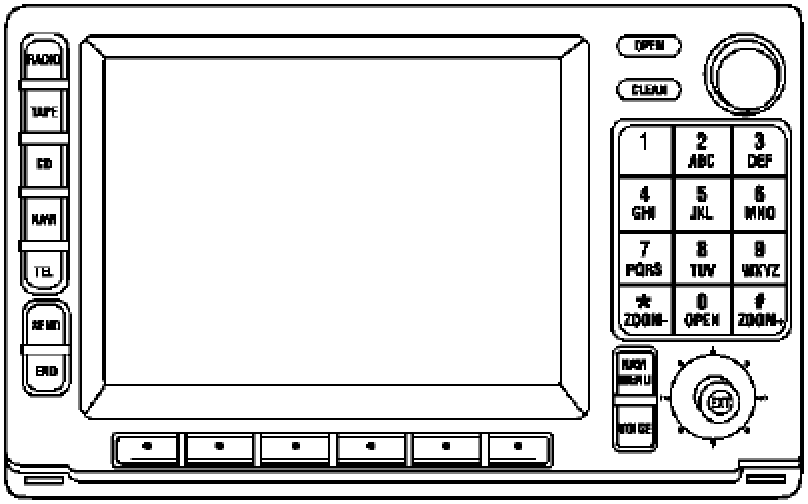


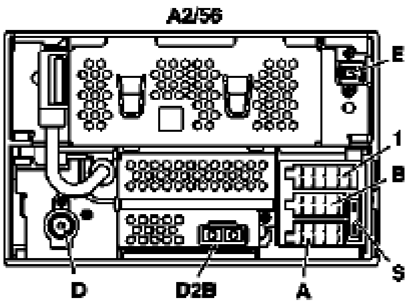
Fig. 19: Identifying Junior Power Timer (JPT) Pin



P82.85-4234-06

<u>**Fig. 20: Identifying Junior Power Timer (JPT) Bushing**</u>

1	*Connector 1 power supply for CD changer (A2/6, D2B wake-up line, ...)*
A2/56	*Radio and navigation module (illustrated on maximum version)*
A	*Connector A (power supply, K-bus,...)*
B	*Connector B (loudspeaker)*
D	*FM/AM antenna signal input*
D2B	*Interface to digital data bus*
E	*GPS antenna signal input*
S	*Equipment fuse*



P82.85-5239-01

<u>**Fig. 21: Identifying Standard Power Timer (SPT) Pin**</u>

a	*HF connection cable FM/AM amplifier - radio*
b	*Voltage supply from radio for FM/AM amplifier*
c	*Antenna signal cables*
A2/18	*FM/AM amplifier*

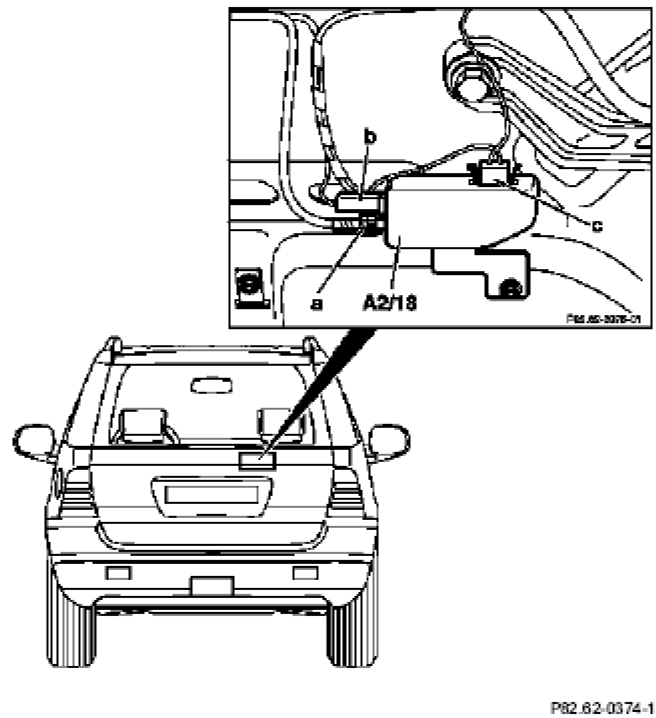
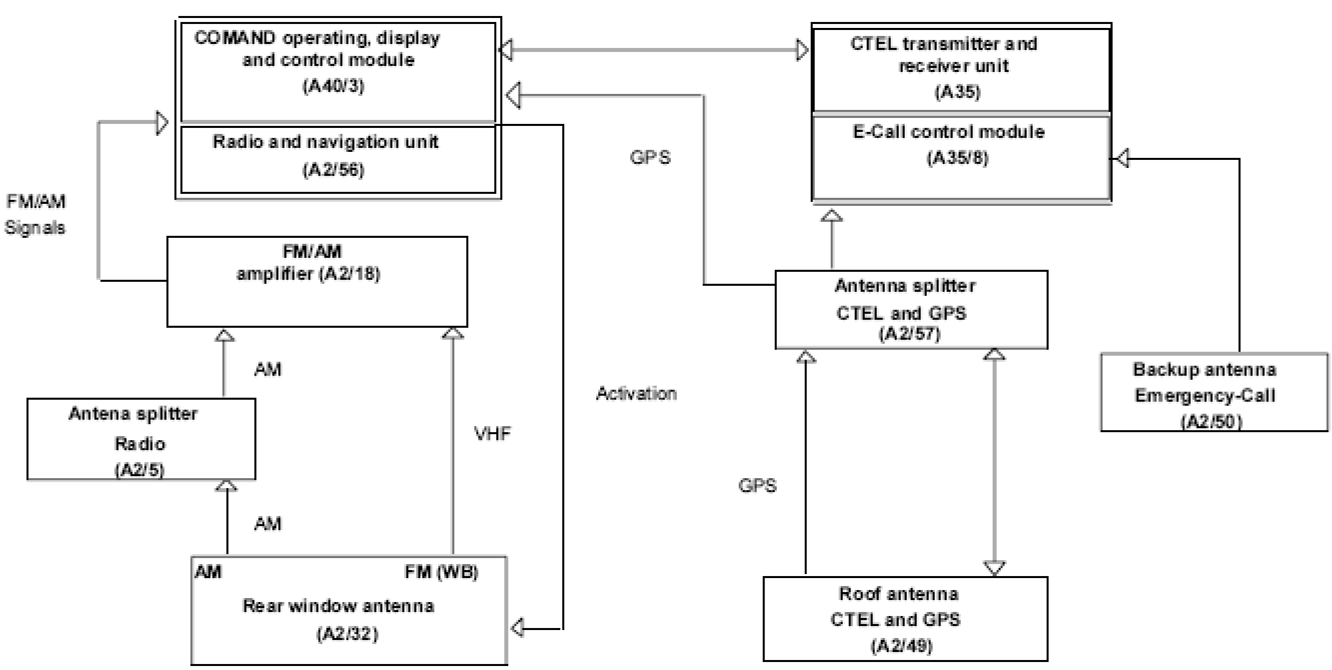


Fig. 22: Identifying Standard Power Timer (SPT) Bushing



Block diagrama antenna system up to 31.08.01

Shown with the following equipment :

- *COMAND operating and display system (code 352a)*

Abbreviations

AM	*AM frequency bands*
FM	*FM frequency band*
WB	*Weather band (only (USA))*
GPS	*Global positioning system*

The components highlighted in gray are only for equipment and version ((USA)) (code 491):

E-Call (code 349)

Radio modular system (MCS) USA (Code 522)

Fig. 23: Identifying Micro-Timer (MT) 3 Bushing

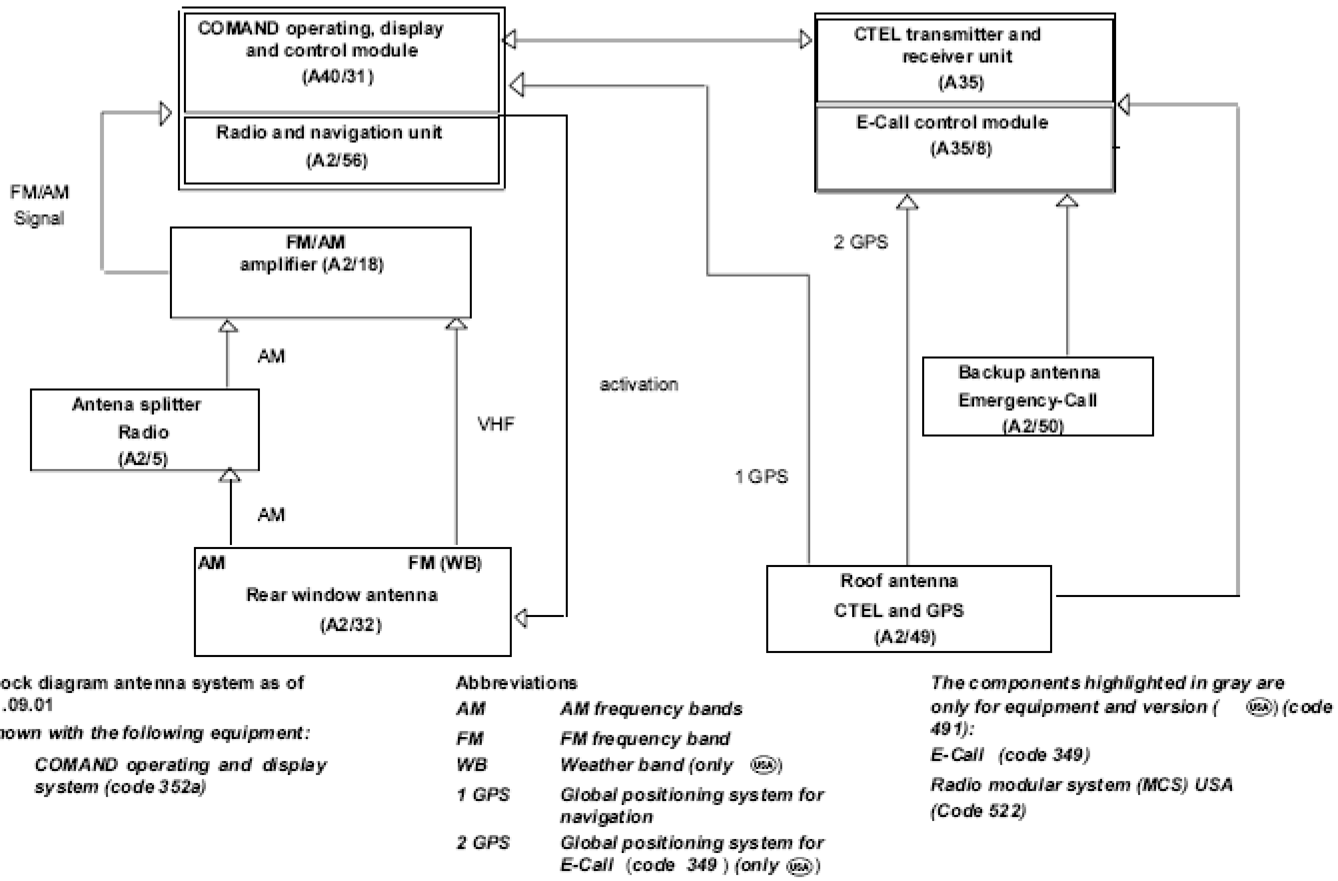
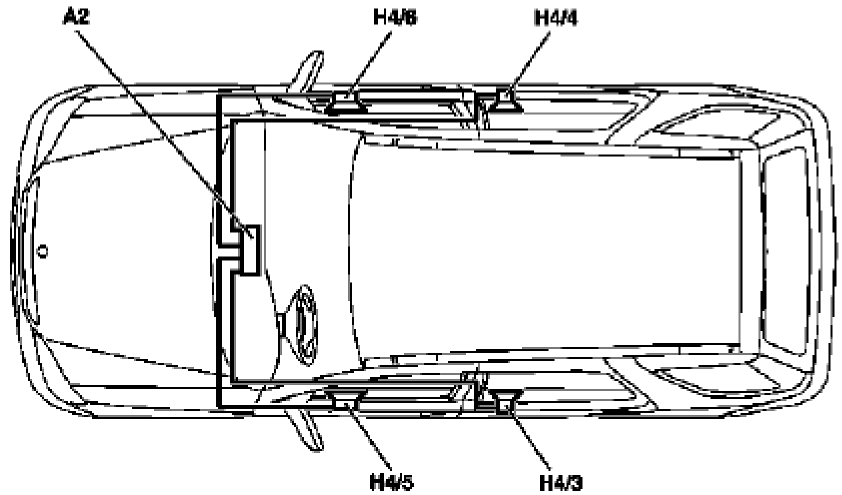


Fig. 24: Identifying Maxi Power Timer (MPT) Bushing

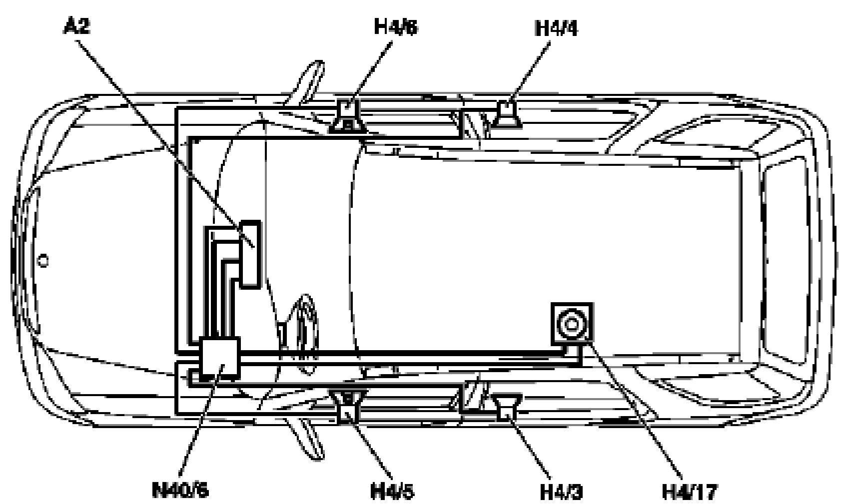
A2	Radio
H4/3	Left rear door speaker
H4/4	Right rear door speaker
H4/5	Left front door speaker
H4/6	Right front door speaker



P82.62-0372-06

Fig. 25: Identifying E95, Female

A2	Radio
H4/3	Left rear door speaker
H4/4	Right rear door speaker
H4/5	Left front door speaker
H4/6	Right front door speaker
H4/17	Acoustimass bass module
N40/6	Amplifier control module (Radio/ speaker)



P82.62-0373-06

Fig. 26: Identifying Multi Contact Point (MCP) Bushing

A2/13	Sound amplifier

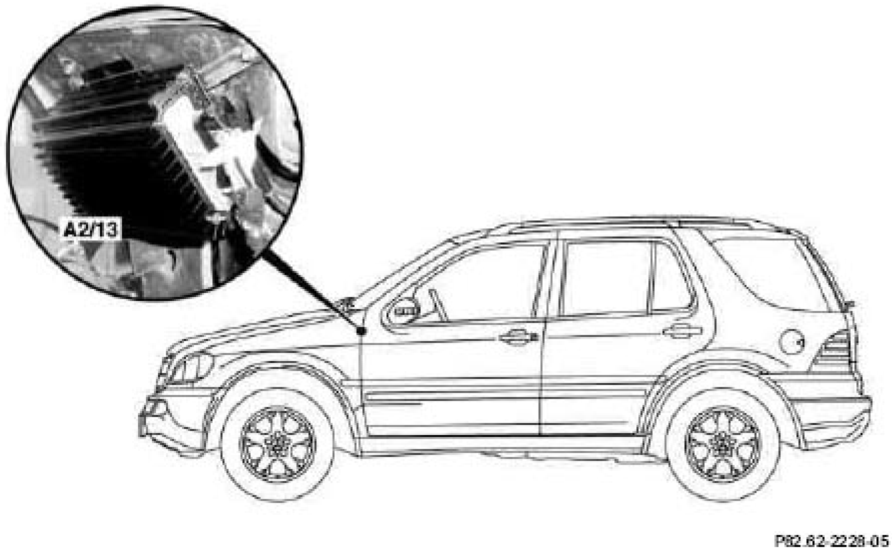


Fig. 27: Identifying Micro Quadlock System (MQS) Male Contact

FM	Antenna for FM reception
AM	Antenna for AM reception
(WB)	Antenna for weather band only (USA)

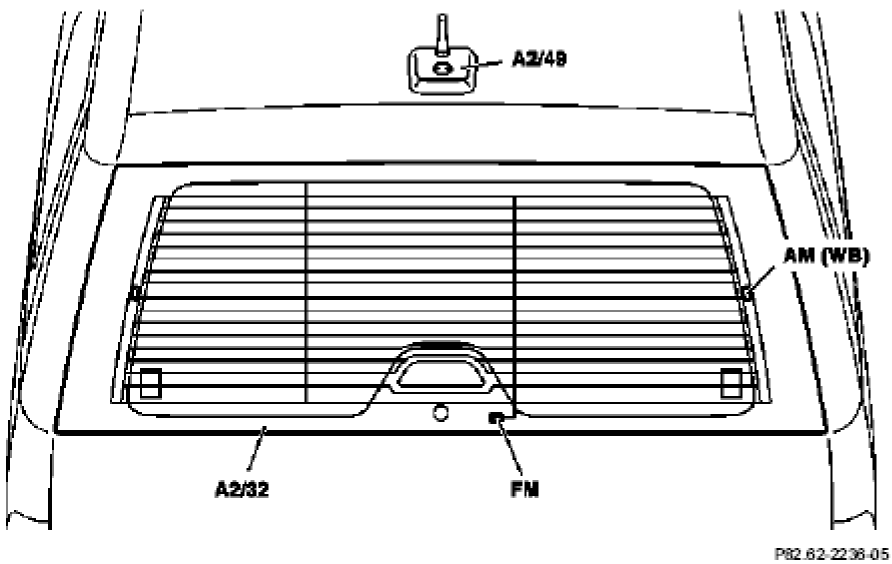


Fig. 28: Identifying Micro Quadlock System (MQS) Female Contact

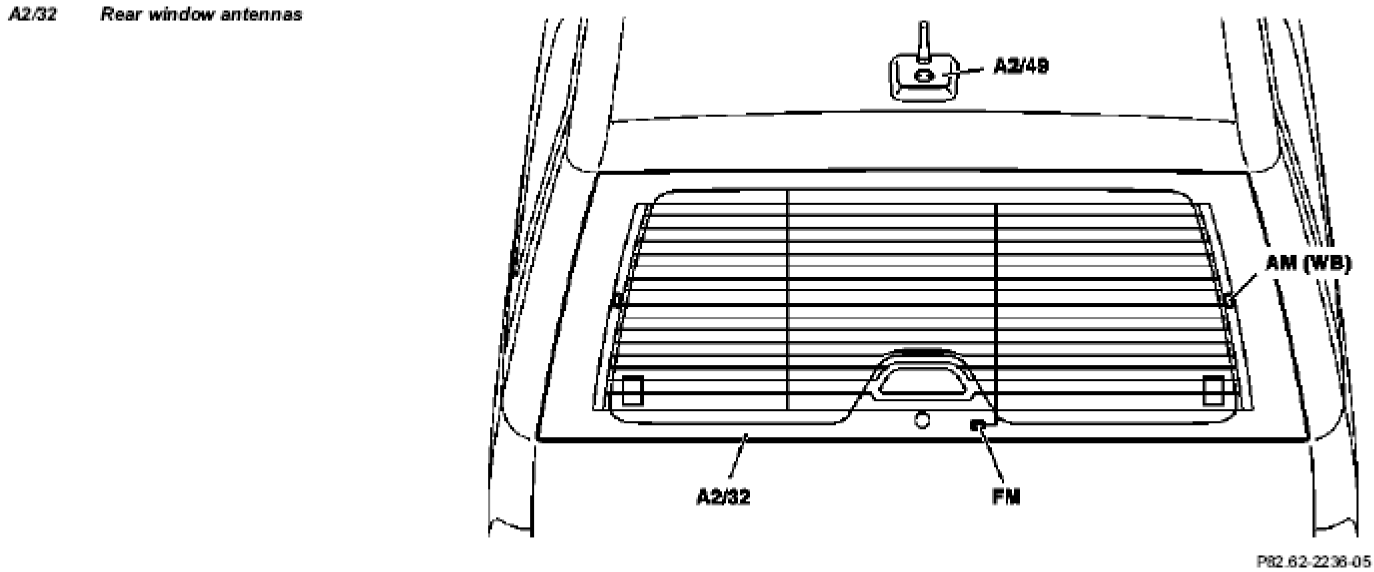


Fig. 29: Identifying Sensor Spade-Type Contact (SLC) Pin

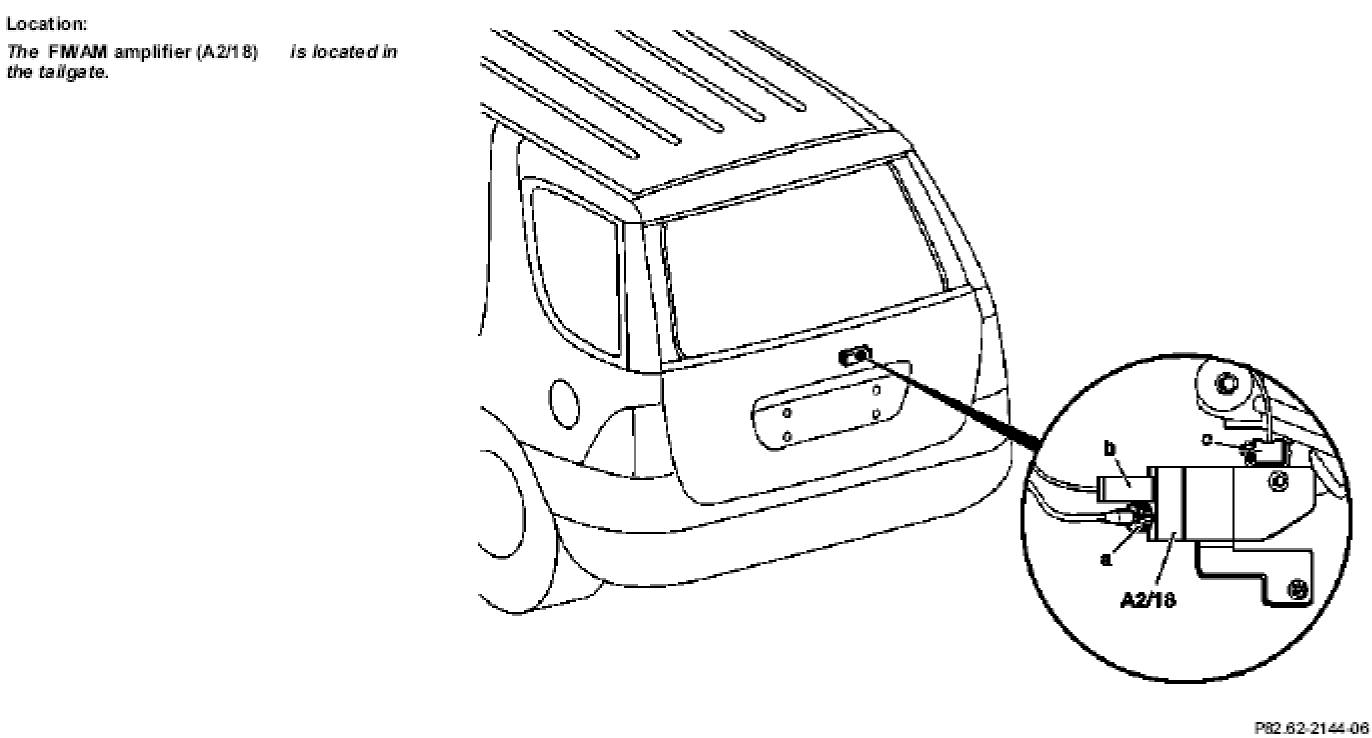


Fig. 30: Identifying Sensor Spade-Type Contact (SLC) Bushing

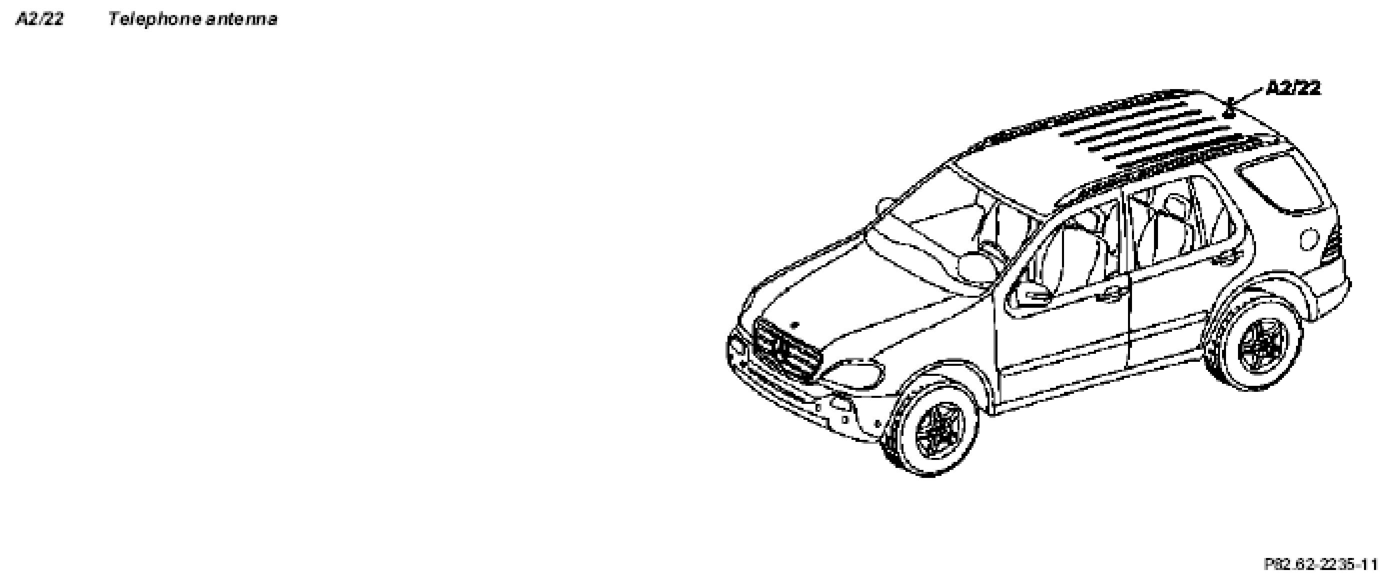


Fig. 31: Identifying Spade-Type Sensor Contact (LSC) Pin

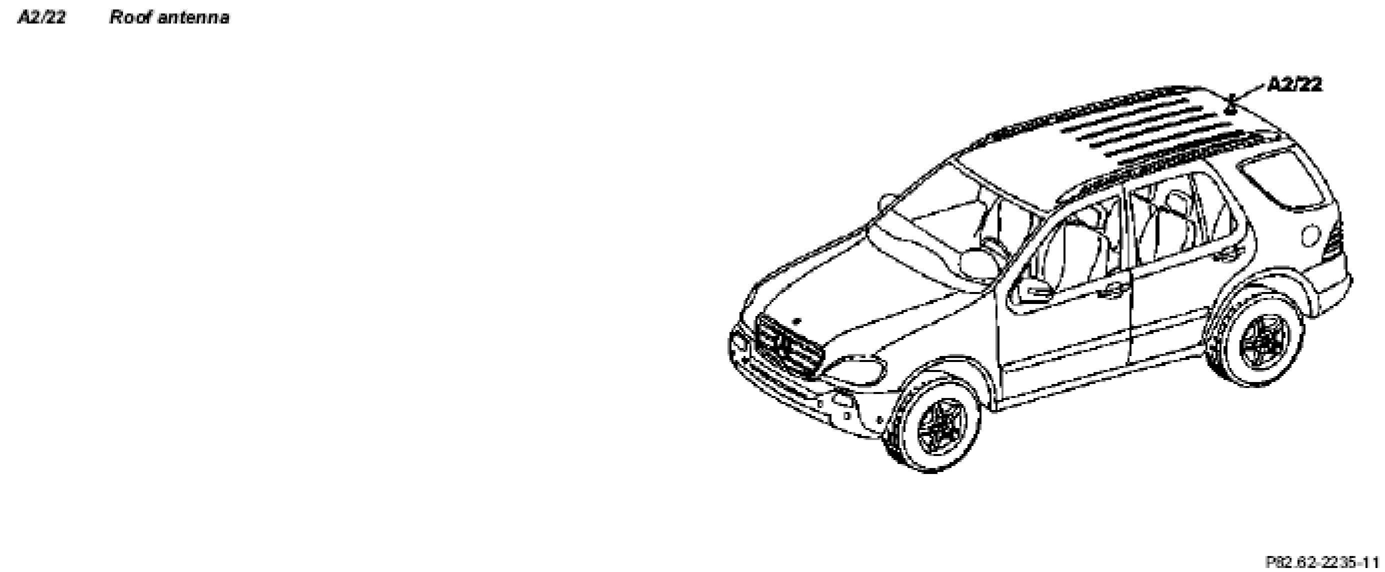


Fig. 32: Identifying Spade-Type Sensor Contact (LSC) Bushing

A2/6 CD player with changer

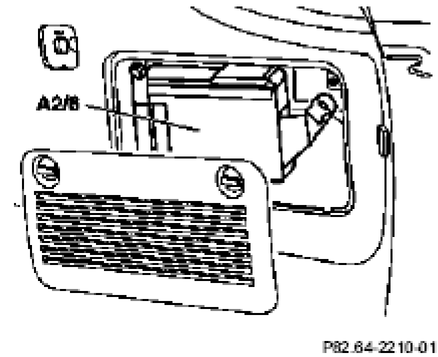


Fig. 33: Identifying Siemens ELO Pin

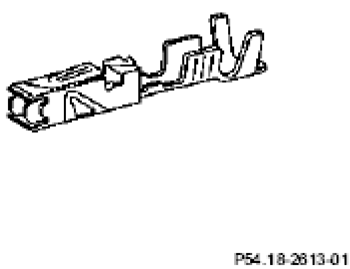


Fig. 34: Identifying Siemens ELO Bushing

A2/6 CD player with changer

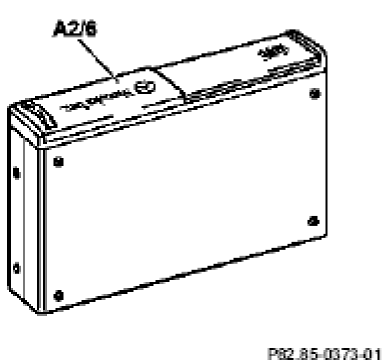


Fig. 35: Identifying Round Plug Contact (RK)-2.5 Solder Male Contact

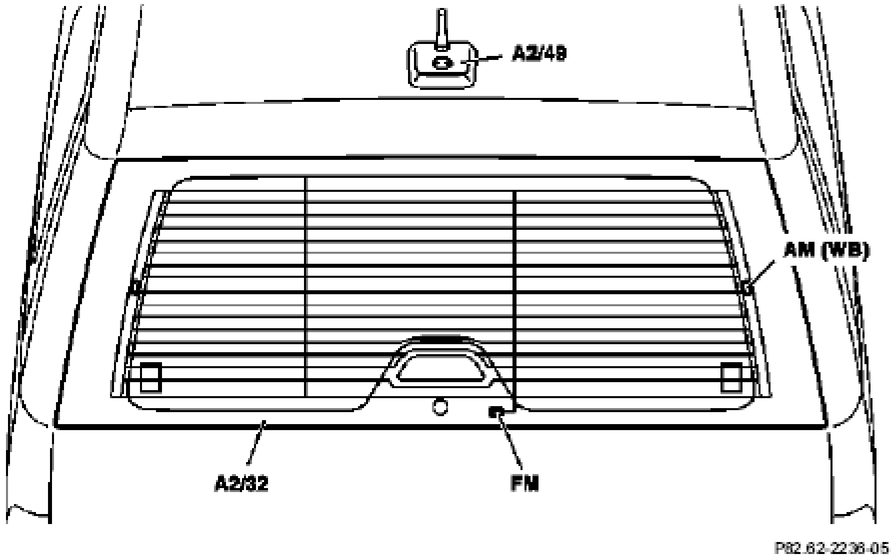


Fig. 36: Identifying Round Plug Contact (RK)-2.5 Solder Female Contact

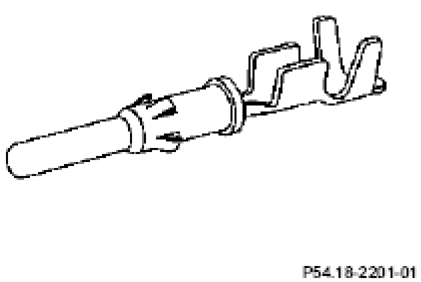


Fig. 37: Identifying Round Plug Contact (RK)-2.5 Variant-1-Pin



Fig. 38: Identifying Round Plug Contact (RK)-2.5 Variant-1 Bushing

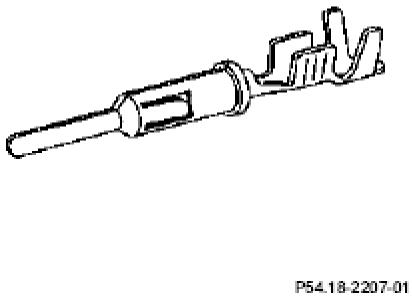


Fig. 39: Identifying Spade-Type Contact System (LKS)-1.5-Pin

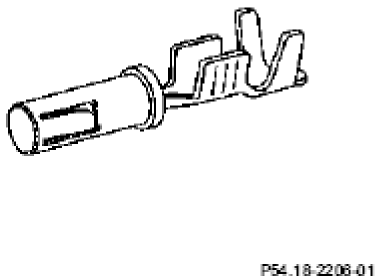


Fig. 40: Identifying Spade-Type Contact System (LKS)-1.5 Bushing

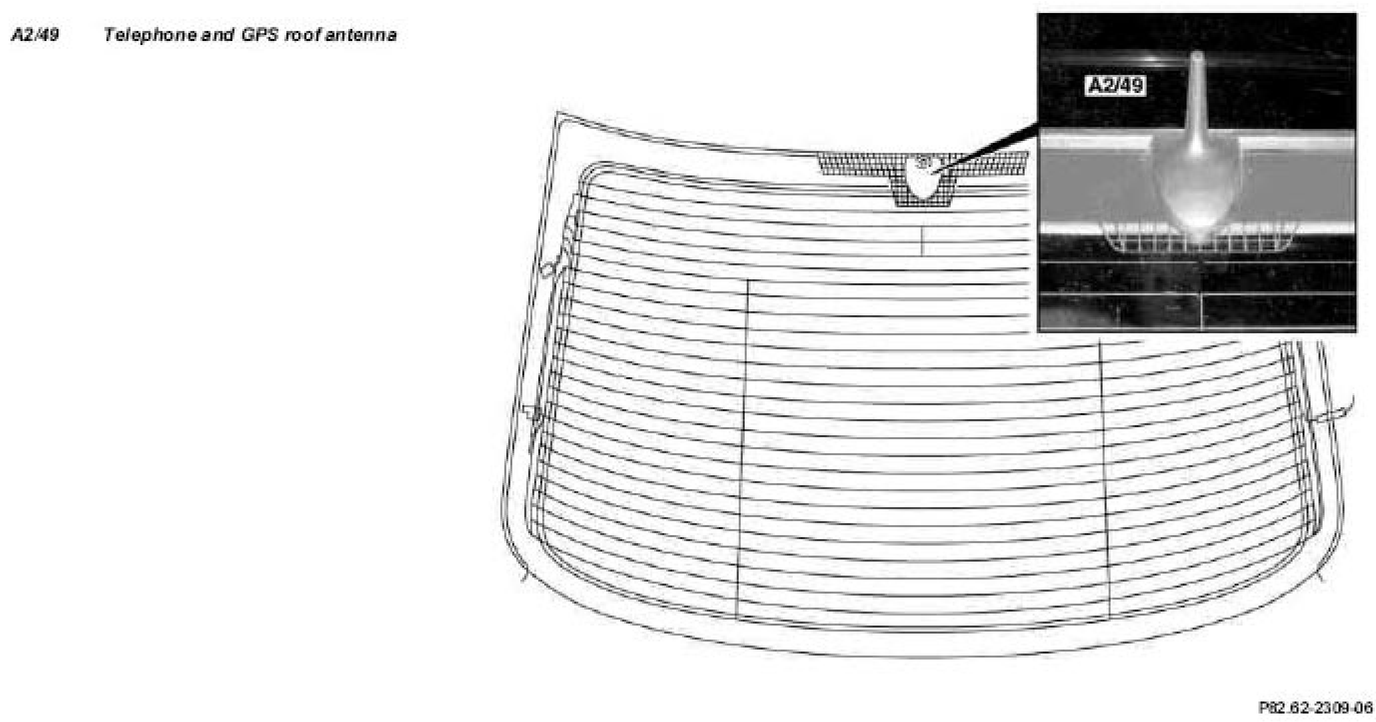
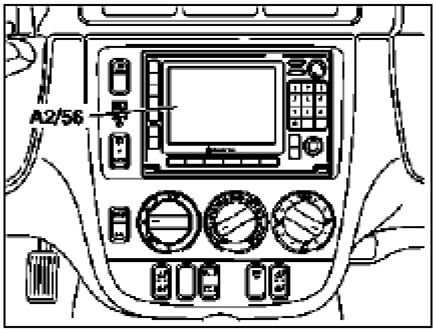
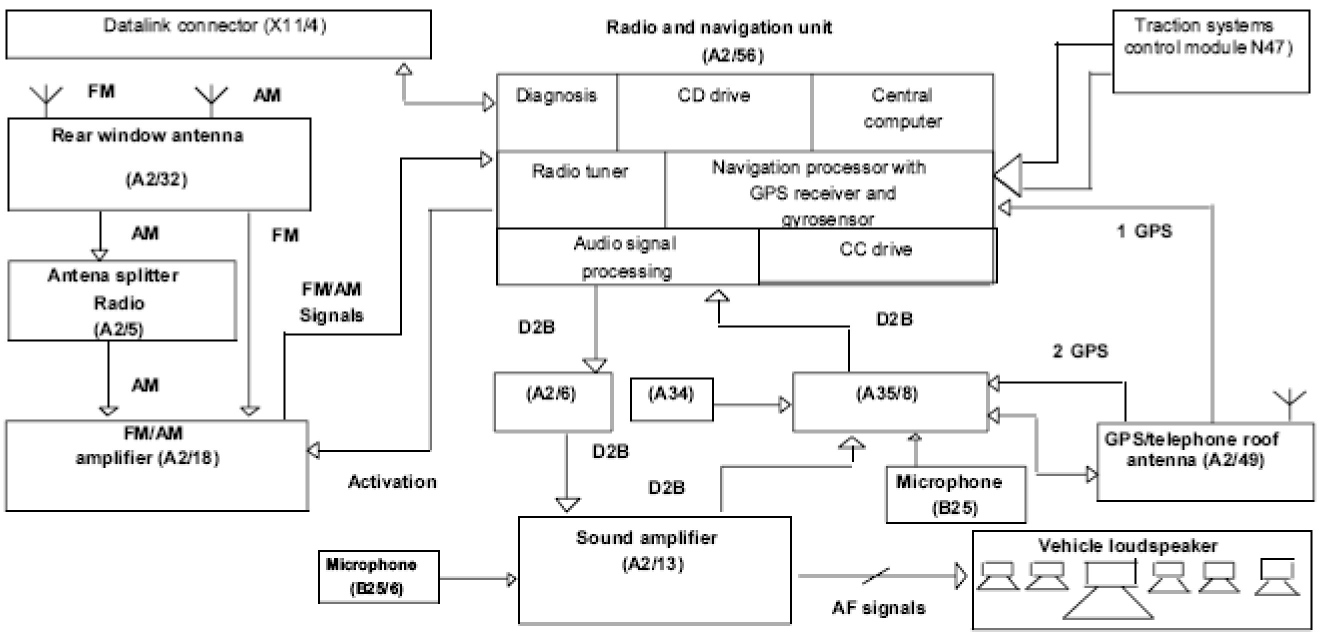


Fig. 41: Identifying Angled-Flat Contact With Auxiliary Spring



P82.85-5236-01

Fig. 42: Identifying Mini Spade-Type Contact (MLC)-1.2-Pin



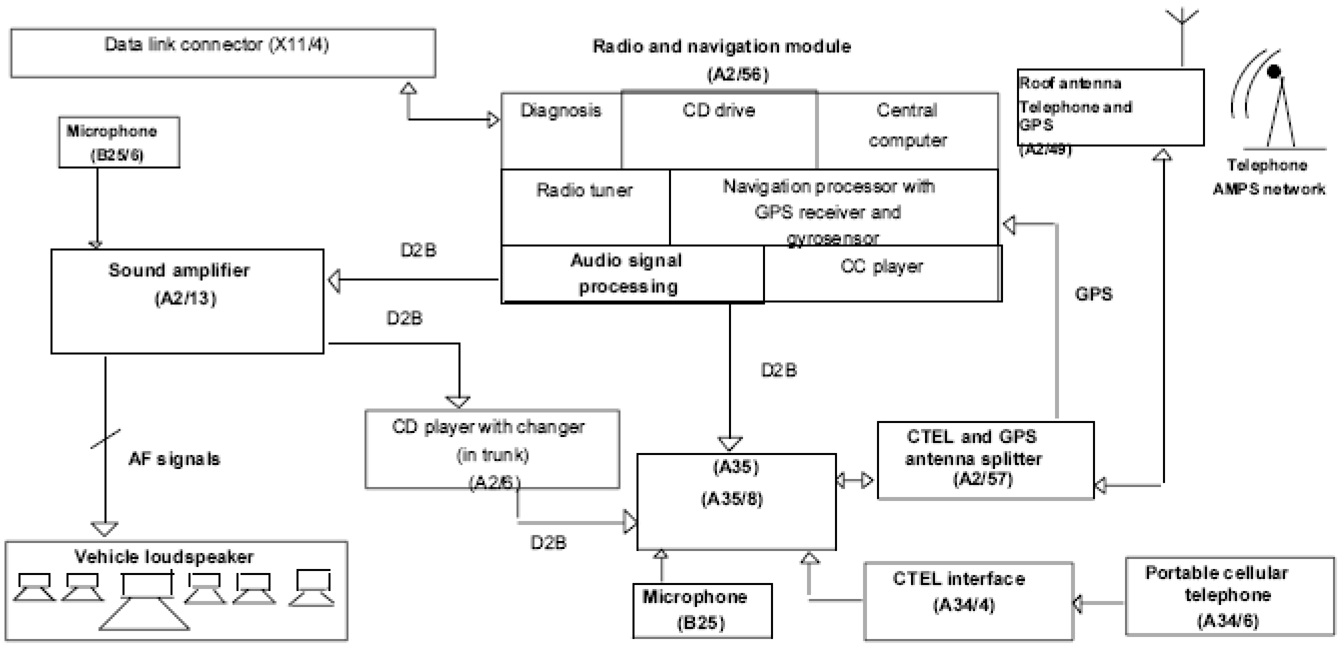
Block diagram for entire MCS system

illustrated with following equipment specification:

- *Sound system (code 810)*
- *CD changer (code 819)*
- *with telephone*

GPS	*Global positioning system*
1 GPS	*Global positioning system for navigation*
2 GPS	*Global positioning system for E-call (code 349)(only USA)*
D2B	*Digital data bus*
AF	*Audio frequency (20 Hz ... 20 kHz)*
A2/6	*CD player with changer (in trunk)*
A2/49	*Cellular telephone and GPS roof antenna*
A34	*Telephone handset*
A35/8	*E-call control module*
B25	*Hands-free system microphone*
B25/6	*Sound amplifier microphone*

Fig. 43: Identifying Mini Spade-Type Contact (MLC)-1.2 Bushing



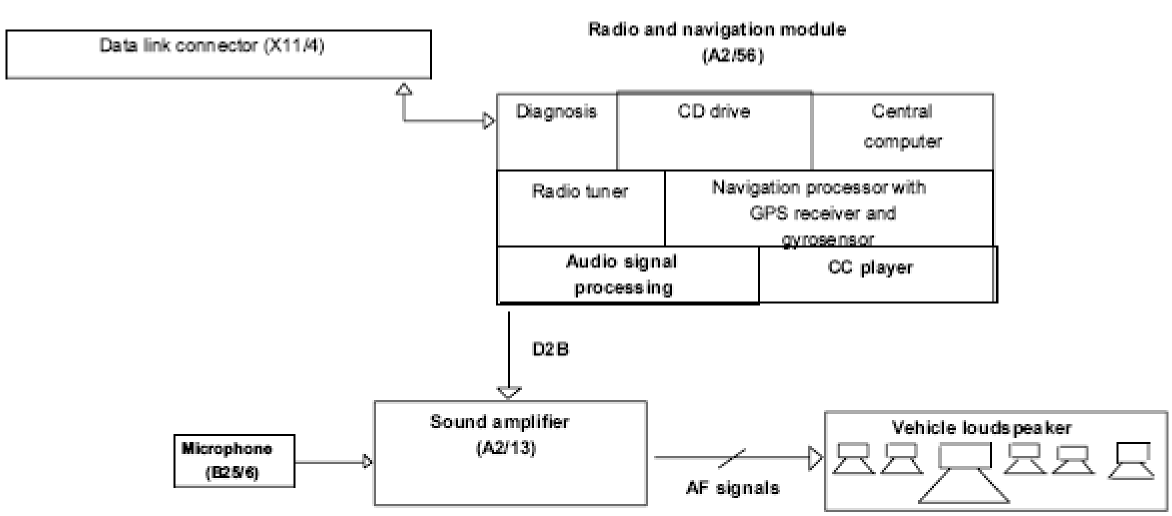
Illustrated with the following equipment specification:

- *Sound system (code 810)*
- *CD changer (code 819)*
- *with telephone*

GPS	*Global positioning system*
D2B	*Digital data bus*
AF	*Audio frequency (20 Hz....20kHz)*
A2/6	*CD player with changer (in trunk)*
A35	*CTEL transmitter/receiver*
A35/8	*E-call control module*
B25	*Hands-free system microphone*
B25/6	*Sound amplifier microphone*

The components marked are significant for the telephone mode .

Fig. 44: Identifying Mini Spade-Type Contact (MLC)-1.2-USC Bushing



Block diagram for MCS cassette mode
illustrated with the following equipment:

- *Sound system (code 810)*

Abbreviations

D2B	*Digital data bus*
AF	*Audio frequency (20 ... 20 kHz)*

The components marked are significant for the cassette mode .

Fig. 45: Identifying YAZAKI 1.5 System

1 *CD slot*
2 *CC slot*

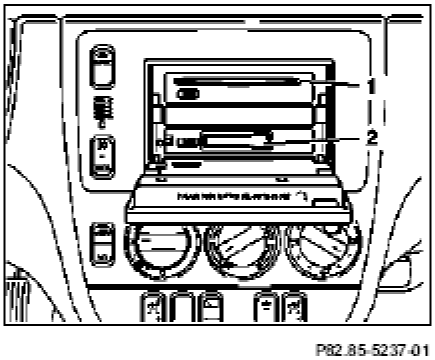


Fig. 46: Identifying YAZAKI 6.3 System

A2/56 *Radio and navigation unit*
AG *Automatic transmission*
D2B *Digital data bus*
MG *Manual transmission*

Illustration: interlinkage on model 170

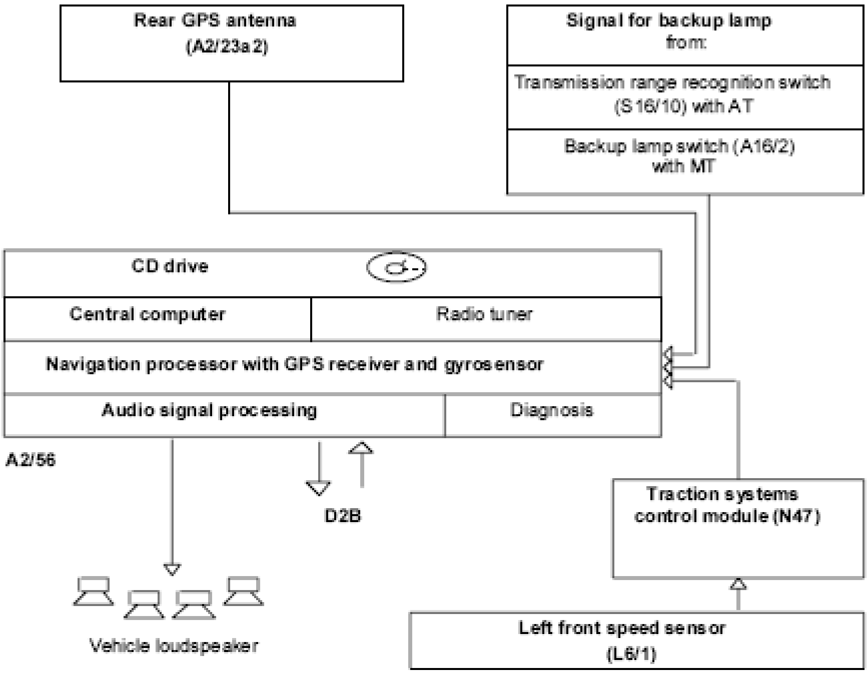
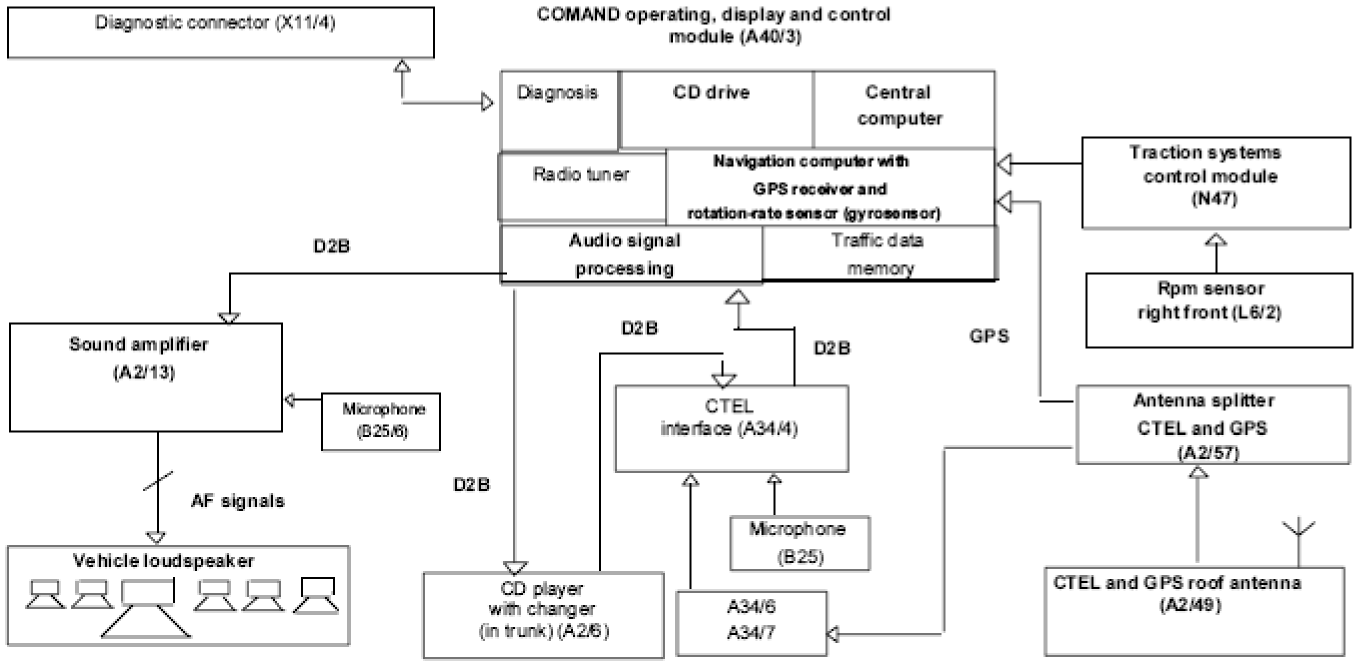


Fig. 47: Identifying Micro Quadlock System (MQS) Male Contact For Flat Conductor Model FFC



Block diagram for COMAND navigation system, *illustrated with*

- *CD changer (code 819)*
- *Sound system (code 810)*
- *without dynamic navigation (code 815)*

Abbreviations

GPS	*Global Positioning System*
D2B	*Digital Data Bus*
AF	*Audio frequency (20 Hz... 20 kHz)*
A34/6	*Portable cellular telephone*
A34/7	*CTEL bracket*
B25	*Hands-free conversation equipment microphone*
B25/6	*Sound amplifier microphone*

The marked components are the main ones involved in navigation operation.

Fig. 48: Identifying Micro Quadlock System (MQS) Female Contact For Flat Conductor Model FFC

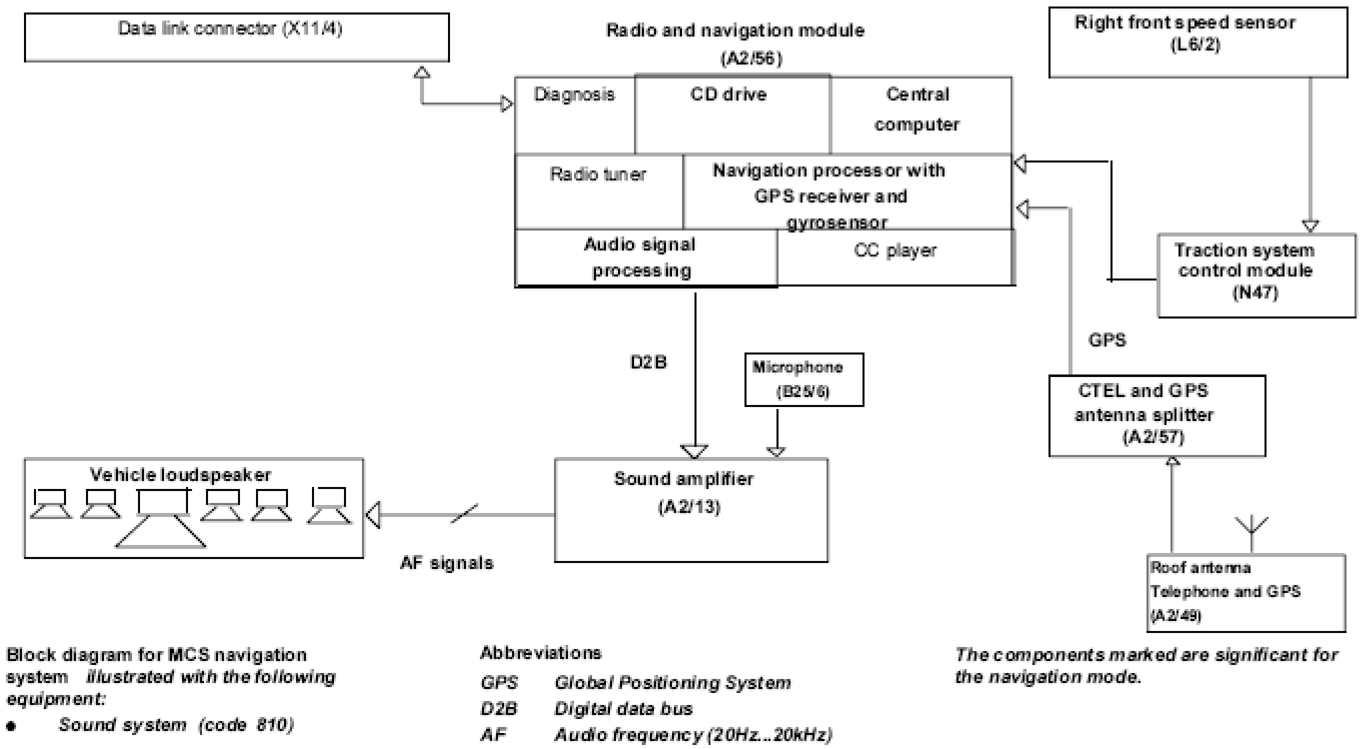


Fig. 49: Identifying Micro Quadlock System (MQS) Male Contact For Flat Conductor Model FPC

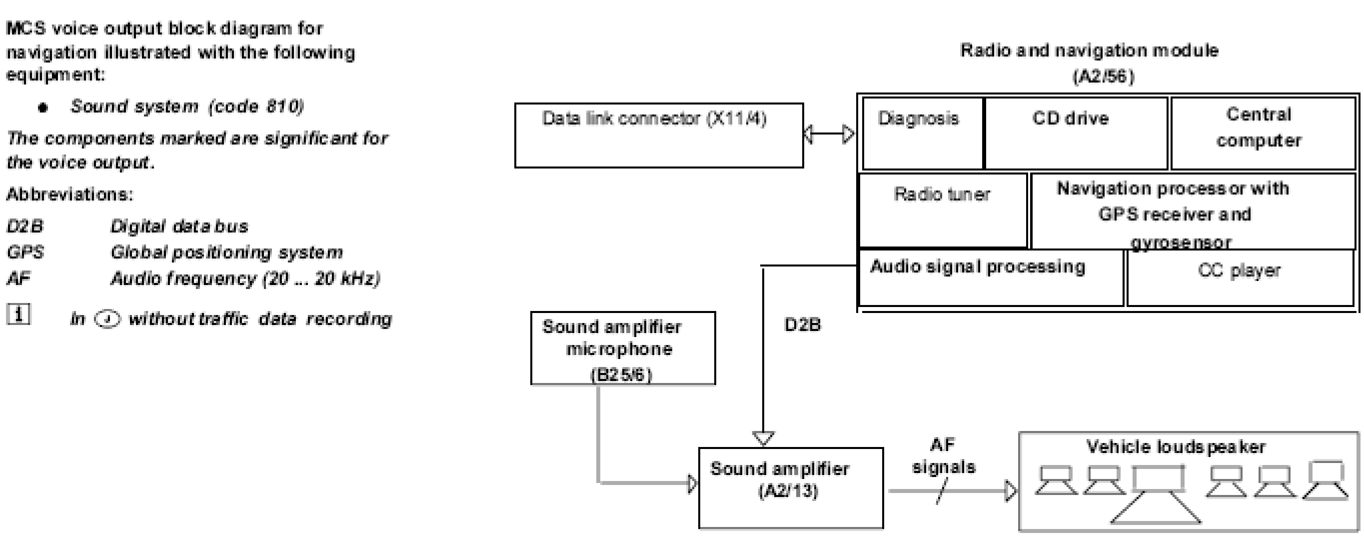


Fig. 50: Identifying Micro Quadlock System (MQS) Female Contact For Flat Conductor Model FPC

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240,	**AH00.19-P-1000-08A**

		245, 251, 414, 461 as of 1.4.94, 463	
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
	Junior power timer contact family	i Plugs and couplings.	**GF00.19-P-8106A**
	Standard power timer contact family	i Plugs and couplings.	**GF00.19-P-8108A**
	Micro timer 3 contact family	i Couplings.	**GF00.19-P-8105A**
	Maxi power timer contact family	i Couplings.	**GF00.19-P-8110A**
	E95 contact family	i Couplings.	**GF00.19-P-8104A**
	Multi contact point contact family	i Plugs and couplings.	**GF00.19-P-8107A**
	Micro quadlock system contact family	Micro quadlock system contact family variant 1 i Plugs and couplings. Micro Quadlock System, variant 2 contact family i Plugs and couplings.	**GF00.19-P-8102A** **GF00.19-P-8102B**
	Sensor laminated contact, connector family	Sensor spade-type contact Design 97 contact family i Plugs and couplings. Sensor spade-type contact Version 2 contact family i Plugs and couplings.	**GF00.19-P-8101A** **GF00.19-P-8101B**
	Spade-type sensor contact family	i Plugs and couplings	**GF00.19-P-8109A**
	Siemens ELO contact family	i Plugs and couplings.	**GF00.19-P-8103A**
	Round plug contact 2.5 variant 1 contact family	i Plugs and couplings.	**GF00.19-P-8111A**
	Round-type contact 2.5 solder contact family	i Plugs and couplings.	**GF00.19-P-8112A**
	Spade-type contact system 1.5 contact family	i Plugs and couplings.	**GF00.19-P-8113A**
	Mini spade-type contact family	i Plugs and couplings.	**GF00.19-P-8115A**

PLUGS AND COUPLINGS AS-BUILT CONFIGURATION - GF00.19-P-8000A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
	Connector part numbers	i The list of part numbers serves only to identify components. Consult replacement parts documentation to determine part order numbers. i The listed numbers designate the first 3 digits of the 10-digit part number.	
		Plugs and couplings., part initial numbers 000	**GF00.19-P-8100AA**
		Plugs and couplings., part initial numbers 001	**GF00.19-P-8100AB**
		Plugs and couplings., part initial numbers 002	**GF00.19-P-8100AC**
		Plugs and couplings., part initial numbers 003	**GF00.19-P-8100AD**
		Plugs and couplings., part initial numbers 005	**GF00.19-P-8100AF**
		Plugs and couplings., part initial numbers 012	**GF00.19-P-8100AM**
		Plugs and couplings., part initial numbers 014	**GF00.19-P-8100AO**
		Plugs and couplings., part initial numbers 017	**GF00.19-P-8100AR**
		Plugs and couplings., part initial numbers 019	**GF00.19-P-8100AT**
		Plugs and couplings., part initial numbers 021	GF00.19-P-8100ED
		Plugs and couplings., part initial numbers 022	GF00.19-P-8100EA
		Plugs and couplings., part initial numbers 023	**GF00.19-P-8100AX**
		Plugs and couplings., part initial numbers 024	GF00.19-P-8100AY
		Plugs and couplings., part	**GF00.19-P-8100BA**

		initial numbers 026	
		Plugs and couplings., part initial numbers 028	**GF00.19-P-8100BD**
		Plugs and couplings., part initial numbers 029	**GF00.19-P-8100BE**
		Plugs and couplings., part initial numbers 030	**GF00.19-P-8100BF**
		Plugs and couplings., part initial numbers 031	**GF00.19-P-8100BG**
		Plugs and couplings., part initial numbers 032	**GF00.19-P-8100BH**
		Plugs and couplings., part initial numbers 033	**GF00.19-P-8100BI**
		Plugs and couplings., part initial numbers 034	**GF00.19-P-8100BJ**
		Plugs and couplings., part initial numbers 035	**GF00.19-P-8100BK**
		Plugs and couplings., part initial numbers 036	**GF00.19-P-8100BL**
		Plugs and couplings., part initial numbers 037	**GF00.19-P-8100BM**
		Plugs and couplings., part initial numbers 038	**GF00.19-P-8100BN**
		Plugs and couplings., part initial numbers 039	GF00.19-P-8100BO
		Plugs and couplings., part initial numbers 040	GF00.19-P-8100BP
		Plugs and couplings., part initial numbers 041	GF00.19-P-8100BQ
		Plugs and couplings., part initial numbers 042	GF00.19-P-8100BR
		Plugs and couplings., part initial numbers 043	GF00.19-P-8100BS
		Plugs and couplings., part initial numbers 044	GF00.19-P-8100BT
		Plugs and couplings., part initial numbers 045	GF00.19-P-8100BU
		Plugs and couplings., part initial numbers 046	GF00.19-P-8100DA
		Plugs and couplings., part initial numbers 047	GF00.19-P-8100DB
		Plugs and couplings., part initial numbers 048	GF00.19-P-8100DC
		Plugs and couplings., part initial numbers 049	GF00.19-P-8100DD

		Plugs and couplings., part initial numbers 050	GF00.19-P-8100EC
		Plugs and couplings., part initial numbers 051	GF00.19-P-8100EB
		Plugs and couplings., part initial numbers 052	GF00.19-P-8100EF
		Plugs and couplings., part initial numbers 053	GF00.19-P-8100EG
		Plugs and couplings., part initial numbers 168	**GF00.19-P-8100BV**
		Plugs and couplings., part initial numbers 169	GF00.19-P-8100EE
		Plugs and couplings., part initial numbers 170	**GF00.19-P-8100BW**
		Plugs and couplings., part initial numbers 193	GF00.19-P-8100BX
		Plugs and couplings., part initial numbers 202	**GF00.19-P-8100BY**
		Plugs and couplings., part initial numbers 203	**GF00.19-P-8100BZ**
		Plugs and couplings., part initial numbers 208	**GF00.19-P-8100CA**
		Plugs and couplings., part initial numbers 210	**GF00.19-P-8100CB**
		Plugs and couplings., part initial numbers 211	GF00.19-P-8100CC
		Plugs and couplings., part initial numbers 220	**GF00.19-P-8100CD**
		Plugs and couplings., part initial numbers 221	GF00.19-P-8100CF
		Plugs and couplings., part initial numbers 230	**GF00.19-P-8100CE**

CONNECTOR PART NUMBERS - GF00.19-P-8100AA

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-numbers 000

	Part number	Designation, Coding, Color	
AR	000 153 08 42	4-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**

☞AR	000 153 09 42	4-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02B**
☞AR	000 545 22 46	2-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 39 30	12-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 40 30	12-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 42 30	18-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 44 30	18-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 46 30	10-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 63 30	14-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 70 30	14-pin MQS coupling, B, blue Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 71 30	14-pin MQS coupling, C, violet Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 72 30	14-pin MQS coupling, D, white Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 86 30	12+2-pin MQS, LWL coupling, - Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 87 30	12+2-pin MQS, LWL coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
☞AR	000 545 88 30	12+2-pin MQS, LWL coupling, B, transparent Remove female contact	**AR00.19-P-0120-04A**

CONNECTOR PART NUMBERS - GF00.19-P-8100AB

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 001

	Part number	**Designation, Coding, Color**	
AR	001 540 24 81	4-pin LKS plug, A, black Remove contact pin	**AR00.19-P-0120-20A**
AR	001 540 28 81	6-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	001 540 32 81	6-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	001 540 79 81	18-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**
AR	001 540 97 81	6-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 03 30	12+2-pin MQS, LWL coupling, A, water blue Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 08 30	58-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02B**
AR	001 545 09 30	58-pin SLK coupling, 0, black Remove female contact	**AR00.19-P-0120-02B**
AR	001 545 12 30	10-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 13 30	10-pin MQS coupling, B, transparent Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 14 30	10-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 50 40	28-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	001 545 59 40	10-pin MQS coupling, -, black Remove female contact	**AR00.19-P-0120-04A**
	001 545 00 73	12+4-pin MQS, JPT coupling, A, black	

AR		Remove MQS female contact Remove JPT female contact	**AR00.19-P-0120-04A** **AR00.19-P-0120-07A**
AR	001 545 01 73	5-pin MQS coupling, A, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 04 73	10-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 08 73	10-pin MQS coupling, A, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 13 73	10-pin MQS coupling, B, blue Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 14 73	10-pin MQS coupling, C, violet Remove female contact	**AR00.19-P-0120-04A**
AR	001 545 08 83	28-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**

CONNECTOR PART NUMBERS - GF00.19-P-8100AC

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 002

	Part number	Designation, Coding, Color		
AR	002 540 04 81	6-pin MQS plug, B, white Remove contact pin	**AR00.19-P-0120-03A**	
AR	002 540 30 81	4-pin LKS plug, D, violet Remove contact pin	**AR00.19-P-0120-20A**	
AR	002 540 31 81	4-pin LKS coupling, D, white Remove female contact	**AR00.19-P-0120-19A**	
AR	002 540 33 81	4-pin LKS coupling, D, violet Remove female contact	**AR00.19-P-0120-19A**	
	002 540 53 81	6-pin MQS coupling, D,		

AR		violet Remove female contact	AR00.19-P-0120-04A	
AR	002 540 59 81	10-pin MQS coupling, A, black Remove female contact	AR00.19-P-0120-04A	
002 540 61 81		3+2-pin MQS, MCP coupling, A, black AR AR	Remove MQS female contact Remove MCP female contact	AR00.19-P-0120-04A AR00.19-P-0120-09A
002 540 62 81		3+2-pin MQS, MCP coupling, B, white AR AR	Remove MQS female contact Remove MCP female contact	AR00.19-P-0120-04A AR00.19-P-0120-09A
002 540 63 81		3+2-pin MQS, MCP coupling, C, blue AR AR	Remove MQS female contact Remove MCP female contact	AR00.19-P-0120-04A AR00.19-P-0120-09A
002 540 64 81		3+2-pin MQS, MCP coupling, D, violet AR AR	Remove MQS female contact Remove MCP female contact	AR00.19-P-0120-04A AR00.19-P-0120-09A
002 540 65 81		3+2-pin MQS, MCP coupling, E, green AR AR	Remove MQS female contact Remove MCP female contact	AR00.19-P-0120-04A AR00.19-P-0120-09A

002 540 67 81		3+3-pin MQS, MCP coupling, A, black		
		AR	Remove MQS female contact	**AR00.19-P-0120-04A**
		AR	Remove MCP female contact	**AR00.19-P-0120-09A**
AR	002 540 75 81	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	002 540 76 81	8-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	002 540 77 81	8-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	002 540 78 81	10-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	002 540 79 81	10-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
002 545 47 40		3+3-pin MQS, MCP coupling, A, black		
		AR	Remove MQS female contact	**AR00.19-P-0120-04A**
		AR	Remove MCP female contact	**AR00.19-P-0120-09A**
AR	002 545 48 40	10-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**	
AR	002 545 49 40	10-pin MQS coupling, -, black Remove female contact	**AR00.19-P-0120-04A**	
AR	002 545 85 40	12-pin MQS coupling, -, black Remove female contact	**AR00.19-P-0120-04A**	

CONNECTOR PART NUMBERS - GF00.19-P-8100AD

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 003

	Part number	Designation, Coding, Color	
AR	003 540 27 81	8-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**
AR	003 540 28 81	8-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**
AR	003 540 45 81	12-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	003 540 47 81	20-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	003 540 81 81	10-pin MQS coupling, D, violet Remove female contact	**AR00.19-P-0120-04A**
AR	003 540 82 81	14-pin MQS plug, -, yellow Remove contact pin	**AR00.19-P-0120-03A**
AR	003 545 01 40	12-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**
AR	003 545 79 40	10-pin MQS coupling, -, black Remove female contact	**AR00.19-P-0120-04A**
AR	003 545 80 40	10-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	003 545 81 40	10-pin MQS coupling, B, transparent Remove female contact	**AR00.19-P-0120-04A**
AR	003 545 82 40	10-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**
AR	003 546 01 40	12-pin MQS coupling, -, black Remove female contact	**AR00.19-P-0120-04A**
AR	003 546 20 40	10-pin SLK coupling, -, black (voltage distributor) Remove female contact	**AR00.19-P-0120-04A**

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 005

	Part number	**Designation, Coding, Color**	
AR	005 540 19 81	14-pin MQS connector, -, - Remove contact pin	**AR00.19-P-0120-03A**
AR	005 545 25 30	18-pin MQS coupling, C, black Remove female contact	**AR00.19-P-0120-04A**
AR	005 545 28 30	32-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	005 545 29 30	10-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**
AR	005 545 34 30	29-pin E 95 coupling, B, black Remove female contact	**AR00.19-P-0120-05A**
AR	005 545 44 30	18-pin MQS coupling, D, black Remove female contact	**AR00.19-P-0120-04A**

CONTACT PART NUMBERS - GF00.19-P-8100AM

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 012

	Part number	**Designation, coding, color**	
AR	012 545 70 26	3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**
AR	012 545 71 26	3-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**
AR	012 545 72 26	3-pin SLK coupling, C, blue Remove female contact	**AR00.19-P-0120-02A**

CONTACT PART NUMBERS - GF00.19-P-8100AO

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 014

	Part number	Designation, coding, color	
AR	014 545 29 26	2-pin SLK coupling, A, black Remove female contact	AR00.19-P-0120-02A
AR	014 545 30 26	2-pin SLK coupling, B, white Remove female contact	AR00.19-P-0120-02A
AR	014 545 31 26	2-pin SLK coupling, C, blue Remove female contact	AR00.19-P-0120-02A

CONNECTOR PART NUMBERS - GF00.19-P-8100AR

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 017

	Part number	Designation, Coding, Color	
AR	017 545 06 28	4-pin RK 2.5 solder contact connector, -, black Remove contact pin	AR00.19-P-0120-18A
AR	017 545 17 28	4-pin RK 2.5 solder contact coupling, -, black Remove female contact	AR00.19-P-0120-17A
AR	017 545 19 28	6-pin RK 2.5 solder contact coupling, -, black Remove female contact	AR00.19-P-0120-17A

CONNECTOR PART NUMBERS - GF00.19-P-8100AT

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 019

	Part number	Designation, Coding, Color	

AR	019 545 19 28	3-pin RK 2.5 solder contact connector, -, red Remove contact pin	**AR00.19-P-0120-18A**
AR	019 545 48 28	8-pin RK 2.5 solder contact coupling, -, black Remove female contact	**AR00.19-P-0120-17A**
AR	019 545 49 28	8-pin RK 2.5 solder contact plug, -, black Remove contact pin	**AR00.19-P-0120-18A**

CONNECTOR PART NUMBERS - GF00.19-P-8100AX

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 023

	Part number	Designation, Coding, Color	
AR	023 545 06 26	5-pin SLK coupling, B, transparent Remove female contact	**AR00.19-P-0120-02B**
AR	023 545 51 26	3-pin SLK coupling, A, - Remove female contact	**AR00.19-P-0120-02A**
AR	023 545 51 28	8-pin RK 2.5 solder contact coupling, -, brown Remove female contact	**AR00.19-P-0120-17A**
AR	023 545 52 26	3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**
AR	023 545 53 26	3-pin SLK coupling, B, transparent Remove female contact	**AR00.19-P-0120-02A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BA

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 026

	Part number	Designation, Coding, Color	
	026 545 82 28	3-pin RK 2.5 solder	

AR		contact coupling, 3, red Remove female contact	**AR00.19-P-0120-17A**
AR	026 545 91 28	6-pin RK 2.5 solder contact coupling, -, green Remove female contact	**AR00.19-P-0120-17A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BD

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 028

	Part number	Designation, Coding, Color	
AR	028 545 27 28	6-pin RK 2.5, variant 1 coupling, B, orange Remove female contact	**AR00.19-P-0120-15A**
AR	028 545 38 28	4-pin SPT coupling, B, black Remove female contact	**AR00.19-P-0120-10A**
AR	028 545 83 28	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	028 545 84 28	4-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BE

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 029

	Part number	Designation, Coding, Color	
AR	029 545 13 28	5-pin SPT coupling, A, black Remove female contact	**AR00.19-P-0120-10A**
AR	029 545 19 28	8-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
	029 545 21 28	4-pin RK 2.5 variant 1	

AR		coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	029 545 23 28	12-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	029 545 25 28	8-pin RK 2.5 variant 1 plug, A, black Remove contact pin	**AR00.19-P-0120-16A**
AR	029 545 27 28	4-pin RK 2.5 variant 1 plug, A, black Remove contact pin	**AR00.19-P-0120-16A**
AR	029 545 29 28	12-pin RK 2.5 variant 1 plug, A, black Remove contact pin	**AR00.19-P-0120-16A**
AR	029 545 55 28	3-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	029 545 75 28	15-pin RK 2.5 variant 1 coupling, Z, black Remove female contact	**AR00.19-P-0120-15A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BF

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 030

	Part number	**Designation, Coding, Color**	
AR	030 545 02 28	3-pin MQS coupling, D, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	030 545 19 28	6-pin RK 2.5 solder contact coupling, B, white Remove female contact	**AR00.19-P-0120-17A**
AR	030 545 28 28	2-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	030 545 59 28	3-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	030 545 60 28	3-pin MQS connector, D, yellow Remove contact pin	**AR00.19-P-0120-03A**

AR	030 545 76 28	3-pin MQS coupling, A, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	030 545 77 28	3-pin RK 2.5 solder contact coupling, -, orange Remove female contact	**AR00.19-P-0120-17A**
AR	030 545 78 28	3-pin RK 2.5 solder contact plug, -, orange Remove contact pin	**AR00.19-P-0120-18A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BG

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 031

	Part number	Designation, Coding, Color	
AR	031 545 00 28	6-pin E95 coupling, -, red Remove female contact	**AR00.19-P-0120-05A**
AR	031 545 55 28	2-pin LSK coupling, A, black Remove female contact	**AR00.19-P-0120-12A**
AR	031 545 56 28	3+4-pin JPT, LSK coupling, A, black Remove JPT female contact Remove LSK female contact	**AR00.19-P-0120-07A** **AR00.19-P-0120-12A**
AR	031 545 57 28	2-pin LSK plug, A, black Remove contact pin	**AR00.19-P-0120-13A**
AR	031 545 58 28	2-pin RK 2.5 variant 1 plug, -, - Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 59 28	2-pin RK 2.5 variant 1 plug, C, blue Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 60 28	2-pin RK 2.5 variant 1 plug, D, yellow Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 62 28	2-pin RK 2.5 variant 1 coupling, C, blue Remove female contact	**AR00.19-P-0120-15A**

AR	031 545 63 28	2-pin RK 2.5 variant 1 coupling, D, yellow Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 64 28	4-pin RK 2.5 variant 1 plug, B, white Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 65 28	4-pin RK 2.5 variant 1 plug, C, blue Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 66 28	8-pin RK 2.5 variant 1 coupling, B, orange Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 67 28	8-pin RK 2.5 variant 1 coupling, C, blue Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 68 28	8-pin RK 2.5 variant 1 coupling, D, yellow Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 69 28	8-pin RK 2.5 variant 1 plug, B, orange Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 70 28	8-pin RK 2.5 variant 1 plug, C, blue Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 71 28	8-pin RK 2.5 variant 1 plug, D, yellow Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 72 28	4-pin RK 2.5 variant 1 coupling, B, white Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 73 28	4-pin RK 2.5 variant 1 coupling, C, blue Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 75 28	18-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	031 545 78 28	2-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 79 28	2-pin RK 2.5 variant 1 plug, -, - Remove contact pin	**AR00.19-P-0120-16A**
	031 545 80 28	2-pin RK 2.5 variant 1 plug, A, black	

AR		Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 81 28	8-pin RK 2.5 variant 1 coupling, B, gray Remove female contact	**AR00.19-P-0120-15A**
AR	031 545 82 28	8-pin RK 2.5 variant 1 plug, B, gray Remove contact pin	**AR00.19-P-0120-16A**
AR	031 545 88 28	18-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BH

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 032

	Part number	Designation, Coding, Color	
AR	032 545 03 28	3-pin RK 2.5 variant 1 plug, A, black Remove contact pin	**AR00.19-P-0120-16A**
AR	032 545 05 28	3-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	032 545 09 28	2-pin RK 2.5 variant 1 coupling, B, white Remove female contact	**AR00.19-P-0120-15A**
AR	032 545 10 28	2-pin RK 2.5 variant 1 plug, B, white Remove contact pin	**AR00.19-P-0120-16A**
AR	032 545 16 28	1-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	032 545 17 28	1-pin RK 2.5 variant 1 plug, A, black Remove contact pin	**AR00.19-P-0120-16A**
AR	032 545 18 28	15-pin RK 2.5 variant 1 coupling, A, black Remove female contact	**AR00.19-P-0120-15A**
AR	032 545 19 28	2-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**
	032 545 20 28	2-pin MQS coupling, C,	

AR		blue Remove female contact	AR00.19-P-0120-04A
AR	032 545 21 28	2-pin MQS coupling, D, violet Remove female contact	AR00.19-P-0120-04A
AR	032 545 24 28	2-pin MQS coupling, Z, blue Remove female contact	AR00.19-P-0120-04A
AR	032 545 52 28	8-pin MQS coupling, B, white Remove female contact	AR00.19-P-0120-04A
AR	032 545 53 28	8-pin MQS coupling, C, blue Remove female contact	AR00.19-P-0120-04A
AR	032 545 68 28	4-pin MQS coupling, D, violet Remove female contact	AR00.19-P-0120-04A
AR	032 545 70 28	4-pin MQS plug, A, black Remove contact pin	AR00.19-P-0120-03A
AR	032 545 83 28	12-pin MQS coupling, A, black Remove female contact	AR00.19-P-0120-04A
AR	032 545 84 28	12-pin MQS coupling, B, white Remove female contact	AR00.19-P-0120-04A
AR	032 545 85 28	12-pin MQS coupling, C, blue Remove female contact	AR00.19-P-0120-04A
AR	032 545 86 28	12-pin MQS coupling, D, yellow Remove female contact	AR00.19-P-0120-04A
AR	032 545 98 28	4-pin MQS coupling, B, white Remove female contact	AR00.19-P-0120-04A
AR	032 545 99 28	4-pin MQS coupling, C, blue Remove female contact	AR00.19-P-0120-04A

CONTACT PART NUMBERS - GF00.19-P-8100BI

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 033

	Part number	Designation, Coding, Color	
AR	033 545 00 28	4-pin MQS coupling, D, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 09 28	3-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 10 28	3-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 50 28	4-pin MQS plug, D, yellow Remove contact pin	**AR00.19-P-0120-03A**
AR	033 545 57 28	6-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 58 28	6-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 59 28	6-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 60 28	6-pin MQS coupling, D, yellow Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 61 28	6-pin MQS coupling, E, green Remove female contact	**AR00.19-P-0120-04A**
AR	033 545 67 28	2-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BJ

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 034

	Part number	Designation, Coding, Color		
AR	034 545 40 28	5-pin JPT coupling, -, - Remove female contact	**AR00.19-P-0120-07A**	
	034 545 41 28	5-pin JPT coupling, A,		

AR		black Remove female contact	**AR00.19-P-0120-07A**	
AR	034 545 42 28	5-pin JPT coupling, B, white Remove female contact	**AR00.19-P-0120-07A**	
AR	034 545 61 28	4-pin RK 2.5 solder contact plug, A, yellow Remove contact pin	**AR00.19-P-0120-18A**	
AR	034 545 63 28	4-pin RK 2.5 solder contact coupling, A, yellow Remove female contact	**AR00.19-P-0120-17A**	
AR	034 545 72 28	2-pin RK 2.5 variant 1 coupling, D, violet Remove female contact	**AR00.19-P-0120-15A**	
AR	034 545 73 28	2-pin RK 2.5 variant 1 plug, D, violet Remove contact pin	**AR00.19-P-0120-16A**	
AR	034 545 75 28	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	034 545 76 28	8-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	034 545 77 28	8-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	034 545 78 28	8-pin MQS coupling, E, green Remove female contact	**AR00.19-P-0120-04A**	
AR	034 545 80 28	8-pin MQS coupling, Z, water blue Remove female contact	**AR00.19-P-0120-04A**	
034 545 93 28		3+4-pin JPT, LSK coupling, B, white AR	Remove JPT female contact	**AR00.19-P-0120-07A**
		AR	Remove LSK female contact	**AR00.19-P-0120-12A**
034 545 94 28		3+4-pin JPT, LSK coupling, C, blue AR	Remove JPT female	**AR00.19-**

		contact	**P-0120-07A**
		Remove LSK female contact	**AR00.19-P-0120-12A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BK

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 035

	Part number	Designation, Coding, Color	
	035 545 26 28	4-pin RK 2.5 variant 1 coupling, D, violet Remove female contact	**AR00.19-P-0120-15A**
	035 545 27 28	4-pin RK 2.5 variant 1 plug, D, violet Remove contact pin	**AR00.19-P-0120-16A**
	035 545 30 28	8-pin RK 2.5 variant 1 coupling, D, violet Remove female contact	**AR00.19-P-0120-15A**
	035 545 31 28	8-pin RK 2.5 variant 1 plug, D, violet Remove contact pin	**AR00.19-P-0120-16A**
	035 545 33 28	4-pin RK 2.5 variant 1 coupling, E, green Remove female contact	**AR00.19-P-0120-15A**
	035 545 34 28	8-pin RK 2.5 variant 1 coupling, E, green Remove female contact	**AR00.19-P-0120-15A**
	035 545 35 28	8-pin RK 2.5 variant 1 plug, E, green Remove contact pin	**AR00.19-P-0120-16A**
	035 545 36 28	4-pin RK 2.5 variant 1 plug, E, green Remove contact pin	**AR00.19-P-0120-16A**
	035 545 45 28	6-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
	035 545 46 28	6-pin MQS coupling, B, white	

AR		Remove female contact	AR00.19-P-0120-04A
AR	035 545 89 28	2-pin MQS connector, B, white Remove contact pin	AR00.19-P-0120-03A
AR	035 545 90 28	2-pin MQS plug, C, blue Remove contact pin	AR00.19-P-0120-03A

CONNECTOR PART NUMBERS - GF00.19-P-8100BL

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 036

	Part number	Designation, Coding, Color	
AR	036 545 10 28	2-pin JPT coupling, -, - Remove female contact	AR00.19-P-0120-07A
AR	036 545 11 28	2-pin JPT coupling, A, black Remove female contact	AR00.19-P-0120-07A
AR	036 545 12 28	2-pin JPT coupling, B, transparent Remove female contact	AR00.19-P-0120-07A
AR	036 545 13 28	2-pin JPT coupling, C, blue Remove female contact	AR00.19-P-0120-07A
AR	036 545 21 28	20-pin MQS plug, A, black Remove contact pin	AR00.19-P-0120-03A
AR	036 545 23 28	3-pin RK 2.5 solder contact connector, 3, red Remove contact pin	AR00.19-P-0120-18A
AR	036 545 55 28	5-pin SLK coupling, A, black Remove female contact	AR00.19-P-0120-02A
AR	036 545 56 28	5-pin SLK coupling, B, white Remove female contact	AR00.19-P-0120-02A
AR	036 545 67 28	3-pin MQS coupling, D, violet Remove female contact	AR00.19-P-0120-04A
AR	036 545 68 28	4-pin MQS coupling, D, violet Remove female contact	AR00.19-P-0120-04A

AR	036 545 73 28	2-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	036 545 87 28	14-pin SLK plug, B, white Remove contact pin	**AR00.19-P-0120-01A**

CONNECTOR PART NUMBERS - GF00.19-P-8100BM

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 037

	Part number	Designation, Coding, Color		
AR	037 545 05 28	2 x 2-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 06 28	2 x 2-pin SLK plug, B, transparent Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 07 28	2 x 2-pin SLK plug, C, blue Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 08 28	2 x 2-pin SLK plug, D, violet Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 09 28	4-pin SLK coupling, C, blue Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 10 28	4-pin SLK coupling, D, violet Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 11 28	2-pin SLK coupling, C, blue Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 12 28	2-pin SLK coupling, D, yellow Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 13 28	2-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 14 28	2-pin SLK plug, B, white Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 15 28	2-pin SLK plug, C, blue Remove contact pin	**AR00.19-P-0120-01A**	

AR	037 545 16 28	2-pin SLK plug, D, yellow Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 19 28	2-pin SLK plug, -, - Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 20 28	6-pin SLK plug, B, white Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 25 28	2-pin MCP coupling, A, black Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 26 28	2-pin MCP coupling, B, white Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 27 28	2-pin MCP coupling, C, blue Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 28 28	2-pin MCP coupling, D, violet Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 29 28	2-pin MCP coupling, E, green Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 30 28	4-pin MCP coupling, -, - Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 31 28	4-pin MCP coupling, A, black Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 32 28	4-pin MCP coupling, C, blue Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 33 28	4-pin MCP coupling, D, violet Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 34 28	6-pin MCP coupling, -, - Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 35 28	6-pin MCP coupling, A, black Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 36 28	6-pin MCP coupling, C, blue Remove female contact	**AR00.19-P-0120-09A**	
	037 545 37 28	6-pin MCP coupling, D, violet		

AR		Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 39 28	10-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 40 28	10-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 53 28	8-pin MQS coupling, F, brown Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 55 28	8-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 56 28	12-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 57 28	12-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 59 28	2-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 60 28	2-pin MQS coupling, D, violet Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 61 28	2-pin MQS coupling, E, green Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 63 28	3-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 64 28	4-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**	
AR	037 545 65 28	4-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
037 545 66 28		5+2-pin MQS, MCP coupling, A, black AR AR	Remove MQS female contact Remove MCP female contact	**AR00.19-P-0120-04A** **AR00.19-P-0120-09A**

037 545 67 28		5+3-pin MQS, MCP coupling, A, black AR AR	Remove MQS female contact Remove MCP female contact	**AR00.19-P-0120-04A** **AR00.19-P-0120-09A**
AR	037 545 73 28	3-pin SLK plug, B, white Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 86 28	4-pin MCP coupling, B, white Remove female contact	**AR00.19-P-0120-09A**	
AR	037 545 94 28	6-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	037 545 97 28	4-pin SLK coupling, D, yellow Remove female contact	**AR00.19-P-0120-02A**	
AR	037 545 98 28	2 x 2-pin SLK plug, D, yellow Remove contact pin	**AR00.19-P-0120-01A**	

CONTACT PART NUMBERS - GF00.19-P-8100BN

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 038

	Part number	Designation, Coding, Color		
AR	038 545 12 28	4-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
038 545 13 28		5+3-pin MQS, MCP coupling, B, white AR Remove MCP female contact	Remove MQS female contact **AR00.19-P-0120-09A**	**AR00.19-P-0120-04A**
AR	038 545 47 28	3-pin MCP coupling, A, black Remove female contact	**AR00.19-P-0120-09A**	

AR	038 545 48 28	3-pin MCP coupling, B, white Remove female contact	AR00.19-P-0120-09A	
AR	038 545 49 28	3-pin MCP coupling, C, blue Remove female contact	AR00.19-P-0120-09A	
AR	038 545 55 28	2-pin MQS coupling, C, yellow Remove female contact	AR00.19-P-0120-04A	
AR	038 545 56 28	2-pin MQS plug, C, yellow Remove contact pin	AR00.19-P-0120-03A	
AR	038 545 61 28	4-pin MQS coupling, E, green Remove female contact	AR00.19-P-0120-04A	
AR	038 545 71 28	6-pin MQS coupling, A, black Remove female contact	AR00.19-P-0120-04A	
AR	038 545 72 28	6-pin MQS coupling, B, white Remove female contact	AR00.19-P-0120-04A	
AR	038 545 73 28	4-pin MQS coupling, C, black Remove female contact	AR00.19-P-0120-04A	
AR	038 545 75 28	4-pin SLK coupling, A, black Remove female contact	AR00.19-P-0120-02A	
AR	038 545 76 28	4-pin SLK coupling, B, white Remove female contact	AR00.19-P-0120-02A	
AR	038 545 78 28	2-pin Siemens ELO coupling, B, yellow Remove female contact	AR00.19-P-0120-23A	
AR	038 545 80 28	2-pin Siemens ELO plug, B, yellow Remove contact pin	AR00.19-P-0120-24A	
AR	038 545 90 28	10-pin SLK coupling, C, blue Remove female contact	AR00.19-P-0120-02A	
AR	038 545 91 28	10-pin SLK coupling, D, violet Remove female contact	AR00.19-P-0120-02A	

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 168

	Part number	Designation, Coding, Color		
AR	168 540 01 81	2-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**	
AR	168 540 11 81	3-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**	
AR	168 545 03 28	4-pin MQS coupling, A, yellow Remove female contact	**AR00.19-P-0120-04A**	
AR	168 545 04 28	4-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	168 545 05 28	4-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	168 545 06 28	9-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	168 545 07 28	24-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	168 545 08 28	2 x 26-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	168 545 09 28	2 x 20-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	168 545 10 28	9-pin JPT coupling, B, white Remove female contact	**AR00.19-P-0120-07A**	
AR	168 545 13 28	52-pin MQS coupling, -, - Remove female contact	**AR00.19-P-0120-04A**	
AR	168 545 17 28	4-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
	168 545 18 28	4-pin JPT plug, A, black		

AR		Remove contact pin	**AR00.19-P-0120-08A**
AR	168 545 21 28	2-pin JPT plug, A, black Remove contact pin	**AR00.19-P-0120-08A**
AR	168 545 23 28	2-pin JPT plug, A, black Remove contact pin	**AR00.19-P-0120-08A**
AR	168 545 25 28	3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 27 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 29 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 30 28	2-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 36 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 37 28	2-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01B**
AR	168 545 42 28	10-pin MQS plug, -, - Remove contact pin	**AR00.19-P-0120-03A**
AR	168 545 43 28	10-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	168 545 58 28	2-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 59 28	10-pin MQS plug, B, transparent Remove contact pin	**AR00.19-P-0120-03A**
AR	168 545 65 28	2-pin SLK coupling, C, blue Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 67 28	2-pin SLK coupling, C, blue Remove female contact	**AR00.19-P-0120-02B**
AR	168 545 69 28	10-pin MQS plug, C, blue Remove contact pin	**AR00.19-P-0120-03A**
	168 545 70 28	3-pin SLK coupling, B,	

AR		white Remove female contact	**AR00.19-P-0120-02B**	
	168 545 18 40	38-pin JPT, MQS coupling, -, black AR	Remove JPT female contact	**AR00.19-P-0120-07A**
		AR	Remove MQS female contact	**AR00.19-P-0120-04B**

CONTACT PART NUMBERS - GF00.19-P-8100BW

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 170

	Part number	Designation, Coding, Color		
AR	170 545 01 28	5-pin JPT coupling, B, white Remove female contact	**AR00.19-P-0120-07A**	
	170 545 05 28	47-pin MQS, MCP coupling, D, black AR	Remove MQS female contact	**AR00.19-P-0120-04B**
		Remove MCP female contact	**AR00.19-P-0120-09A**	
AR	170 545 43 28	47-pin MQS, MCP coupling, D, black Remove MQS female contact Remove MCP female contact	**AR00.19-P-0120-04B** **AR00.19-P-0120-09A**	

CONTACT PART NUMBERS - GF00.19-P-8100BY

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 202

		Designation, Coding,		

	Part number	Color		
AR	202 540 59 81	16-pin MT -3 coupling, -, black Remove MT -3 female contact	**AR00.19-P-0120-06A**	
202 545 43 28		47-pin MQS, MCP coupling, A, black AR	Remove MQS female contact	**AR00.19-P-0120-04B**
		Remove MCP female contact	**AR00.19-P-0120-09A**	

CONNECTOR PART NUMBERS - GF00.19-P-8100BZ

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 203

	Part number	Designation, Coding, Color	
AR	203 540 03 81	3-pin MQS plug, B, black Remove contact pin	**AR00.19-P-0120-03A**
AR	203 545 01 28	6-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	203 545 03 28	6-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	203 545 05 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR AR	203 545 19 28	47-pin MQS, MCP coupling, A, black Remove MQS female contact Remove MCP female contact	**AR00.19-P-0120-04B** **AR00.19-P-0120-09A**
AR	203 545 20 28	47-pin MQS, MCP coupling, B, black Remove MQS female contact Remove MCP female	**AR00.19-P-0120-04B** **AR00.19-P-0120-09A**

AR		contact	
AR	203 545 25 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**
AR	203 545 30 28	3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**
AR	203 545 36 28	4-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	203 545 38 28	3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**
AR	203 545 46 28	2-pin MLK coupling, A, black Remove female contact	**AR00.19-P-0120-26A**
AR	203 545 48 28	3-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02A**
AR	203 545 49 28	3-pin SLK coupling, B, gray Remove female contact	**AR00.19-P-0120-02A**
AR	203 545 51 28	4-pin JPT coupling, A, gray Remove female contact	**AR00.19-P-0120-07A**

CONTACT PART NUMBERS - GF00.19-P-8100CA

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 208

	Part number	Designation, Coding, Color	
AR	208 540 01 81	14-pin MQS coupling, Z, black Remove female contact	**AR00.19-P-0120-04A**
AR	208 540 05 81	14-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 02 28	8-pin MQS coupling, Z, blue Remove female contact	**AR00.19-P-0120-04A**
	208 545 03 28	8-pin MQS coupling, C,	

AR		blue Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 04 28	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 05 28	8-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 07 30	14-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 08 30	14-pin MQS coupling, Z, black Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 09 28	8-pin MQS coupling, E, green Remove female contact	**AR00.19-P-0120-04A**
AR	208 545 10 28	8-pin MQS coupling, F, brown Remove female contact	**AR00.19-P-0120-04A**

CONNECTOR PART NUMBERS - GF00.19-P-8100CB

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 210

	Part number	Designation, Coding, Color		
AR	210 440 01 81	6-pin SPT coupling, a Remove female contact	**AR00.19-P-0120-10A**	
AR	210 440 03 81	6-pin SPT coupling, A, black Remove female contact	**AR00.19-P-0120-10A**	
AR	210 440 04 81	6-pin SPT coupling, A, black Remove female contact	**AR00.19-P-0120-10A**	
AR	210 440 05 81	6-pin SPT coupling, A, black Remove female contact	**AR00.19-P-0120-10A**	
AR	210 540 13 81	12-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	

AR	210 540 14 81	18-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 20 81	2-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 21 81	3-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 30 81	12-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 32 81	18-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 36 81	6-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 43 81	4-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 540 47 81	2-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**	
AR	210 540 49 81	4-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**	
AR	210 540 74 81	4-pin E 95 coupling, B black Remove female contact	**AR00.19-P-0120-05A**	
AR	210 545 01 30	8-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
210 545 01 45		9-pin E 95, JPT coupling, B, black AR AR	Remove E 95 female contact Remove JPT female contact	**AR00.19-P-0120-05A** **AR00.19-P-0120-07A**
210 545 02 46		4-pin MPT, JPT coupling AR	Remove MPT female	**AR00.19-**

		AR	contact Remove JPT female contact	P-0120-14A AR00.19-P-0120-07A
AR	210 545 03 30	4-pin JPT coupling, A, black Remove female contact	AR00.19-P-0120-07A	
210 545 04 81		E95, JPT coupling, 1, black AR AR	Remove E 95 female contact Remove JPT female contact	AR00.19-P-0120-05A AR00.19-P-0120-07A
210 545 05 81		E 95, JPT coupling, 2, black AR AR	Remove E 95 female contact Remove JPT female contact	AR00.19-P-0120-05A AR00.19-P-0120-07A
AR	210 545 07 28	27-pin E 95 coupling, B, black Remove female contact	AR00.19-P-0120-05A	
AR	210 545 07 30	40-pin MQS coupling, A, black Remove female contact	AR00.19-P-0120-04A	
210 545 11		E 95, JPT coupling, 1, gray AR AR	Remove E 95 female contact Remove JPT female contact	AR00.19-P-0120-05A AR00.19-P-0120-07A
210 545 12 81		E 95, JPT coupling, 2, gray AR	Remove E 95 female contact Remove JPT female contact	AR00.19-P-0120-05A AR00.19-P-0120-

		AR		**07A**
AR	210 545 13 28	2-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 17 28	25-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 545 18 28	30-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	210 545 40 28	1-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 41 28	3-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 42 28	5-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 43 28	8-pin MQS coupling, Z, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	210 545 61 28	3-pin JPT coupling, B, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 63 28	2-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 65 28	6-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	210 545 76 28	4-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
210 545 81 28		5+2-pin JPT, SPT coupling AR AR	Remove JPT female contact Remove SPT female contact	**AR00.19-P-0120-07A** **AR00.19-P-0120-10A**
	210 545 82 28	5-pin JPT coupling, B, black		

AR		Remove female contact	**AR00.19-P-0120-07A**
AR	210 545 83 28	2-pin JPT coupling, B, white Remove female contact	**AR00.19-P-0120-07A**
AR	210 545 84 28	2-pin JPT coupling, C, blue Remove female contact	**AR00.19-P-0120-07A**
AR	210 545 86 28	7-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**
AR	210 545 87 28	4-pin JPT coupling, Z, black Remove female contact	**AR00.19-P-0120-07A**
AR	210 545 92 28	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**

CONNECTOR PART NUMBERS - GF00.19-P-8100CD

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

plugs and couplings, part initial numbers 220

	Part number	Designation, Coding, Color	
AR	220 540 00 81	6-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**
AR	220 540 02 81	6-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**
AR	220 540 03 81	6-pin MQS plug, B, black Remove contact pin	**AR00.19-P-0120-03A**
AR	220 540 06 81	3-pin MQS coupling, B, black Remove female contact	**AR00.19-P-0120-04A**
AR	220 540 07 81	6-pin MQS coupling, C, black Remove female contact	**AR00.19-P-0120-04A**
AR	220 540 08 81	6-pin MQS coupling, Z, black Remove female contact	**AR00.19-P-0120-04A**

AR	220 540 14 81	12-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	220 540 22 81	4-pin MQS plug, A, black Remove contact pin	**AR00.19-P-0120-03A**	
AR	220 540 27 81	12-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	220 540 28 81	3-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 00 26	2 x 7-pin MQS coupling, O, black Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 04 29	5-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02B**	
AR	220 545 04 30	12-pin MQS coupling, C, black Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 09 29	10-pin MQS coupling, D, violet Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 19 28	20-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 29 28	8-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
220 545 34 28		2+8-pin SLK, LSK coupling, A, black AR AR	Remove SLK female contact Remove LSK female contact	**AR00.19-P-0120-02A** **AR00.19-P-0120-12A**
AR	220 545 36 28	14-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 37 28	14-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
	220 545 39 28	4-pin SLK coupling, A,		

AR		black Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 40 28	4-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 46 28	5-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02B**	
AR	220 545 51 28	6-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 52 28	6-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 53 28	2-pin SLK coupling, -, - Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 53 28	2-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 55 28	2-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 57 28	4-pin JPT plug, -, - Remove contact pin	**AR00.19-P-0120-08A**	
AR	220 545 58 28	4-pin JPT plug, Z, water blue Remove contact pin	**AR00.19-P-0120-08A**	
AR	220 545 65 28	10-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 66 28	10-pin MQS coupling, B, white Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 67 28	10-pin MQS coupling, C, blue Remove female contact	**AR00.19-P-0120-04A**	
220 545 68 28		2+8-pin SLK, LSK coupling, B, white AR AR	Remove SLK female contact Remove LSK female contact	**AR00.19-P-0120-02A** **AR00.19-P-0120-12A**

AR	220 545 69 28	6-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 71 28	2 x 3-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 74 28	10-pin Siemens ELO coupling, A, yellow Remove female contact	**AR00.19-P-0120-23A**	
AR	220 545 75 28	10-pin Siemens ELO plug, A, yellow Remove contact pin	**AR00.19-P-0120-24A**	
AR	220 545 81 28	2 x 2-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	220 545 82 28	2 x 2-pin SLK plug, B, white Remove contact pin	**AR00.19-P-0120-01A**	
AR	220 545 84 28	2 x 5-pin SLK coupling, A, black Remove female contact	**AR00.19-P-0120-02A**	
AR	220 545 85 28	2-pin Siemens ELO coupling, A, yellow Remove female contact	**AR00.19-P-0120-23A**	
AR	220 545 86 28	2-pin Siemens ELO plug, A, yellow Remove contact pin	**AR00.19-P-0120-24A**	
AR	220 545 90 28	3-pin MQS coupling, A, black Remove female contact	**AR00.19-P-0120-04A**	
AR	220 545 92 28	14-pin SLK plug, A, black Remove contact pin	**AR00.19-P-0120-01A**	
AR	220 545 94 28	9-pin JPT coupling, A, black Remove female contact	**AR00.19-P-0120-07A**	
AR	220 545 95 28	9-pin JPT coupling, B, white Remove female contact	**AR00.19-P-0120-07A**	
220 545 96 28		4-pin MT -3, JPT coupling, A, black AR	Remove MT -3 female contact	**AR00.19-P-0120-06A**

		AR	Remove JPT female contact	**AR00.19-P-0120-07A**
AR	220 545 99 28	14-pin SLK coupling, B, white Remove female contact	**AR00.19-P-0120-02A**	

CONTACT PART NUMBERS - GF00.19-P-8100CE

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Connector and couplings part-original-number 230

	Part number	Designation, Coding, Color		
AR	230 540 00 81	2-pin MQS coupling, C, black Remove female contact	**AR00.19-P-0120-04A**	
230 545 01 28		47-pin MQS, MCP coupling, A, black AR	Remove MQS female contact	**AR00.19-P-0120-04B**
		Remove MCP female contact	**AR00.19-P-0120-09A**	

SENSOR LAMINATED CONTACT, CONNECTOR FAMILY - GF00.19-P-8101A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Sensor spade-type contact, Design 97 contact family

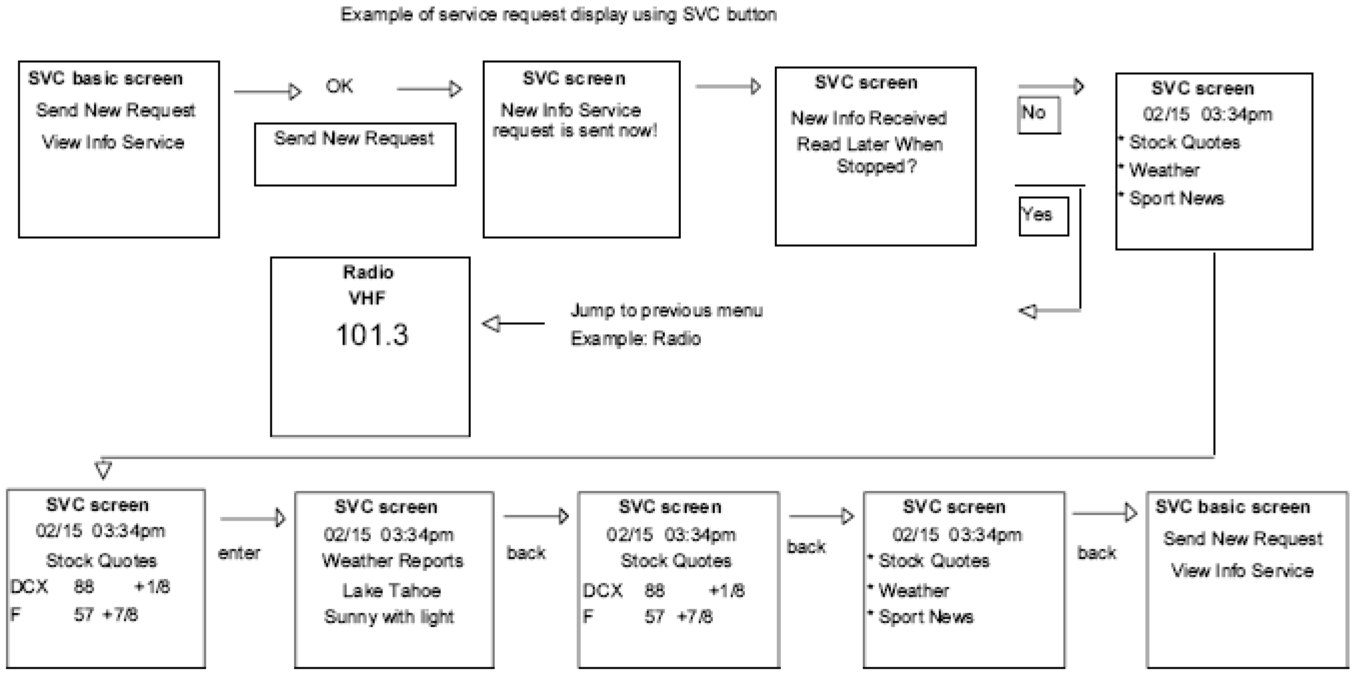


Fig. 51: Identifying 2-Pin Slk Coupling

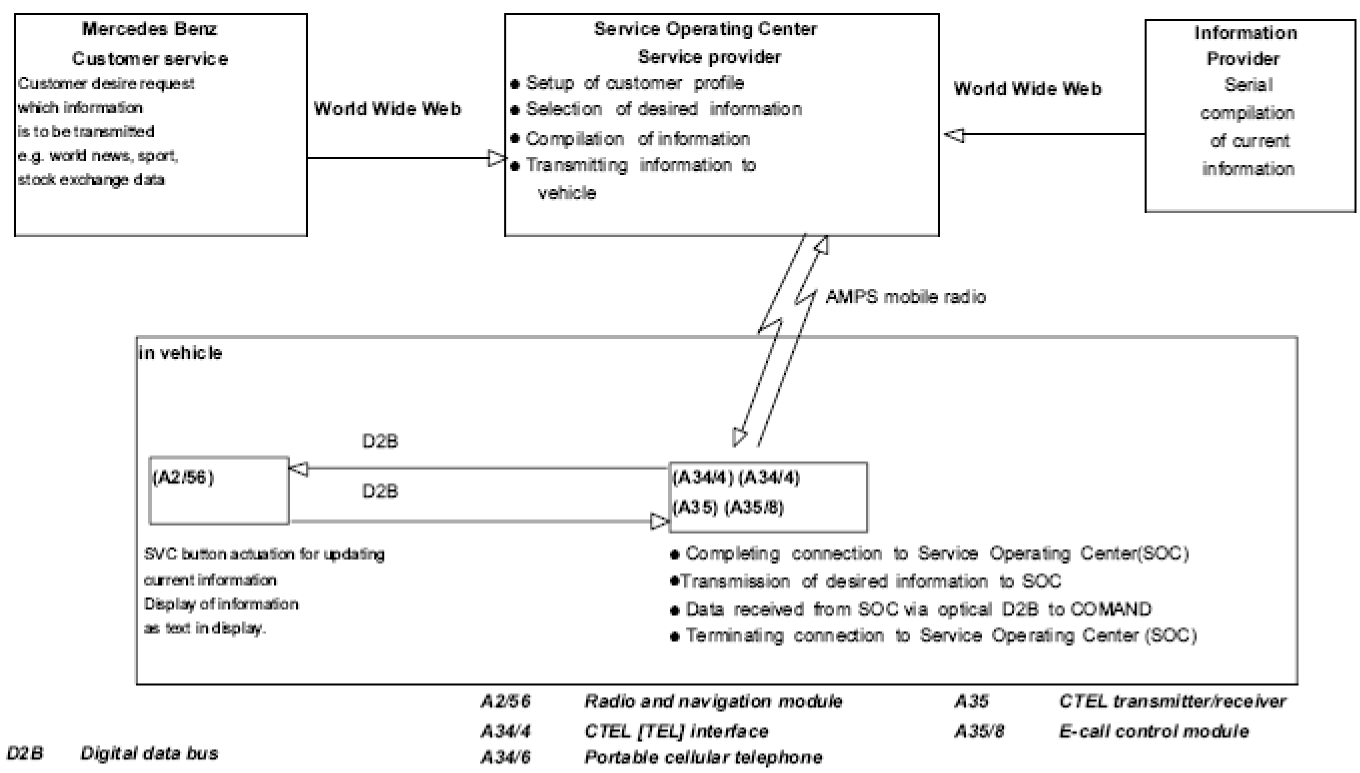


Fig. 52: Identifying 3-Pin SLK Coupling

A2/57	CTEL and GPS antenna splitter
40	Coaxial cable for CTEL and GPS roof antenna (A2/49)
41	Coaxial cable to GPS receiver

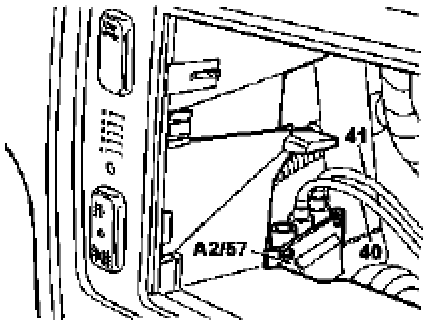


Fig. 53: Identifying 4-Pin SLK Coupling

A2/57	CTEL and GPS antenna splitter
40	Connection for coaxial cable of CTEL and GPS roof antenna (A2/49)
41	Connection for coaxial cable to GPS receiver

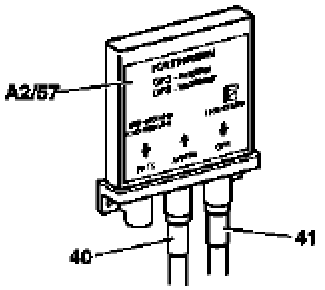


Fig. 54: Identifying 5-Pin SLK Coupling

A2/57	CTEL and GPS antenna splitter
40	Connection for coaxial cable from CTEL and GPS roof antenna (A2/49)
41	Connection for coaxial cable to GPS receiver

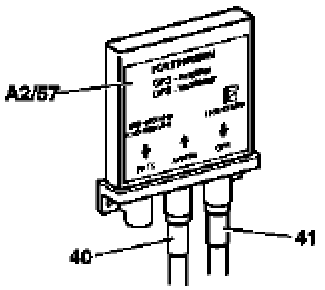


Fig. 55: Identifying 6-Pin SLK Coupling

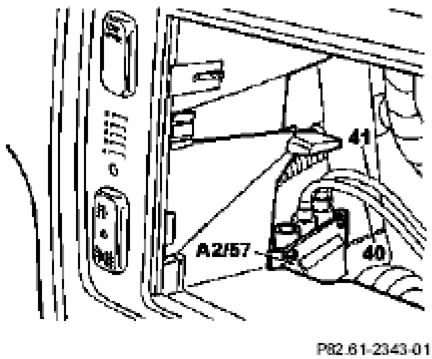


Fig. 56: Identifying 2-Pin SLK Coupling

1	*Rear bumper*
A2/50	*EMERGENCY-CALL backup antenna*

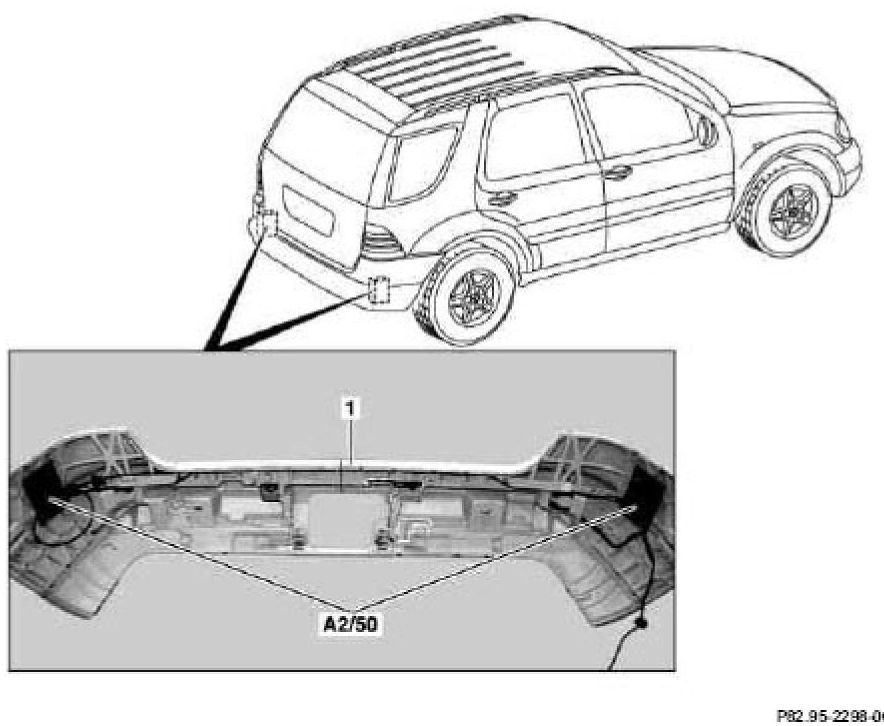


Fig. 57: Identifying 2 X 2-Pin SLK Plug

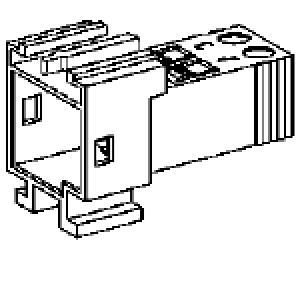


Fig. 58: Identifying 3-Pin SLK Plug

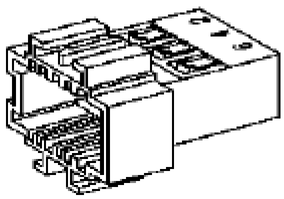


Fig. 59: Identifying 6-Pin SLK Plug

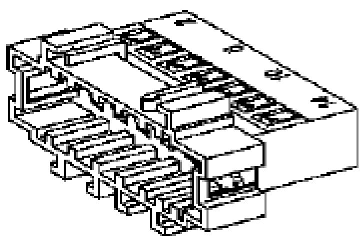


Fig. 60: Identifying 14-Pin SLK Plug

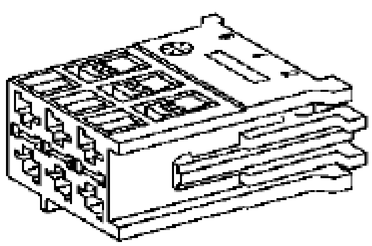


Fig. 61: Identifying 2 X 3-Pin SLK Coupling

1	Special wrench
2	Cover
3	Threaded sleeve
4	Foam seal
5	Grommet
A2/49	CTEL and GPS roof antenna

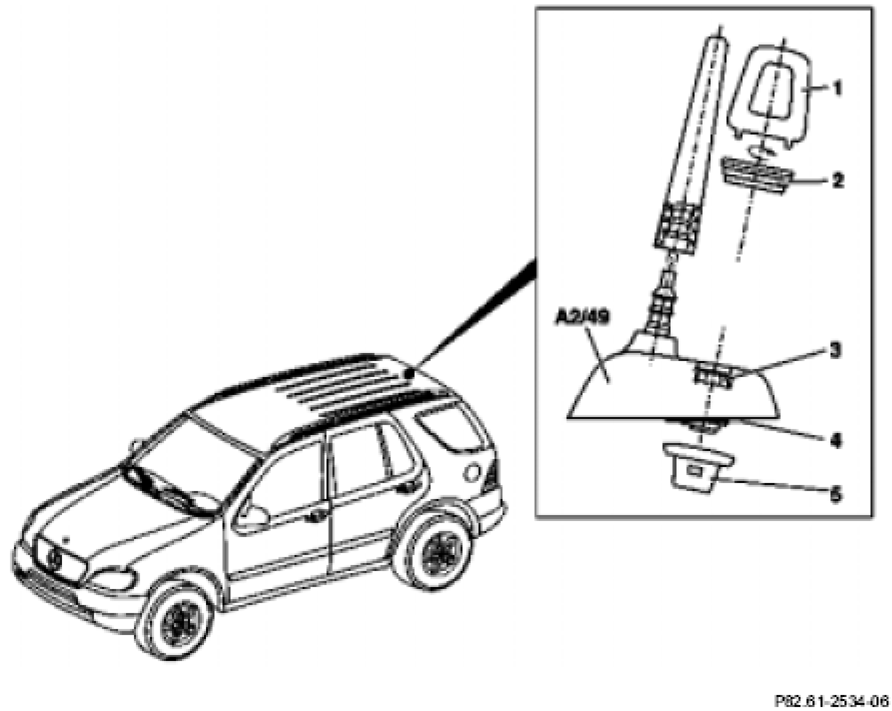


Fig. 62: Identifying 8+2-Pin SLK, LSK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Front dome lamp (with shut-off delay and front reading lamp) (E15/2)** Automatic actuation	C —(E15/2 (V))— B	Disconnect coupling on (E15/2). actuation of interior lighting "Dome lamp ON".	11-14 V	• Cables • All-Activity Module (AAM) (N10)

Fig. 63: Identifying 2X5-Pin SLK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Left rear dome lamp (E15/8)** Automatic actuation	C —(E15/8 (V))— B	Actual value Interior lighting "Rear lamps ON"	11-14 V	• Cables
1.1	**Right rear dome lamp (E15/9)** Automatic actuation	C —(E15/9 (V))— B	Actual value Interior lighting "Rear lamps ON"	11-14 V	• Cables • All-Activity Module (AAM) (N10)

Fig. 64: Identifying 14-Pin SLK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear dome lamp (E15/3)** Voltage supply	A — E15/3 (V) — B		11-14 V	• Cables
1.1	**Rear dome lamp (E15/3)** Automatic actuation	C — E15/3 (V) — B	Tailgate closed	11-14 V	• Cables

Fig. 65: Identifying 3-Pin SLK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Front wiper "Intermittent switch"** HHT actual value		Combination switch (S4) in "Intermittent wipe" position		• S4
1.1	**Wiper relay (F1k17)** Actuation		Actuation of "Front wiper ON relay"	Relay switches audibly	⇒1.4
1.2	**Wiper motor (M6/1) intermittent wipe switch position** Actuation	30 — F1k17 — 87	Disconnect relay, combination switch (S4) in "Intermittent wipe" position	Motor runs	Value in order: • F1k17 Value not in order: ⇒1.3
1.3	**Wiper motor (M6/1) OFF switch position** Actuation	30 — F1k17 — 87	Disconnect relay, combination switch (S4) in "OFF" position	Motor runs	Value in order: • S4 Value not in order: • Cable • S4 • Wiper motor (M6/1)
1.4	**Wiper relay (F1k17)** Actuation voltage	85 — F1k17 (V) — 86	Actuation of "Front wiper ON relay"	11-14 V	Value in order: • F1k17 Value not in order: • Cable • All-Activity Module (AAM) (N10)

Fig. 66: Identifying 10-Pin SLK Coupling (Voltage Distributor)



P00.19-2896-01

Fig. 67: Identifying 10-Pin SLK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Rear window wiper motor (M6/4)** Actuation	30 —(M6/4k1)—87	Ignition: **ON** Disconnect tailgate wiper motor relay (M6/4k1). **Danger!** **&.3.1.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor runs	• M6/4
1.1	**Rear window wiper motor (M6/4)** Test cam-operated switch	30 —(M6/4k1)—87a	Move motor out of rest position, as in 1.0 **Danger!** **&.3.2.(** AH82.30-P-6100-01Z) Use fuse cable 124 589 37 63 00 for battery connection	Motor remains in rest position	• Cam-operated switch on M6/4

Fig. 68: Identifying 5-Pin SLK Plug



P00.19-2907-01

Fig. 69: Identifying 2-Pin SLK Coupling



P00.19-2906-01

Fig. 70: Identifying 2-Pin SLK Coupling

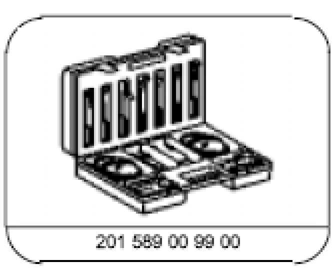
	Scope of test	Measuring instrument/ Test connection	Operation/ Requirement	Specified value	● Possible cause/Remedy
1.0	**Rear window wiper/ washer switch Intermittent** HHT actual value		Ignition: ON Rear window wiper/washer switch (S78) in "Intermittent wipe" position.	ON	Value in order: ⇒1.1 Value not in order: ⇒ 1.2
1.1	**Rear window wiper/ washer switch Wash** HHT actual value		Ignition: ON, rear window wiper/washer switch (S78) in "Wash" position.	ON	Value in order: ⇒No fault Value not in order: ⇒ 1.2
1.2	**Voltage supply**	4 —(S87 -(V)+ ⊥	Ignition ON	11-14 V	Value in order: ● Rear window wiper/washer switch (S78) Value not in order: ● Cable

Fig. 71: Identifying 2-Pin SLK Plug



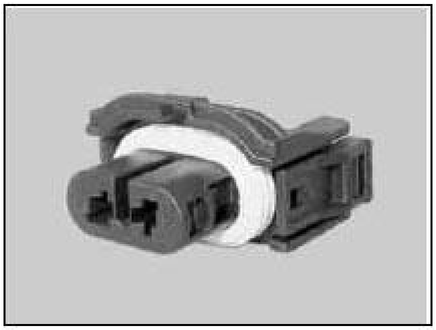
P00.19-2984-01

Fig. 72: Identifying 8-Pin SLK Coupling



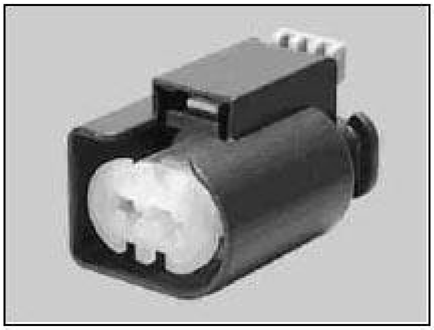
Electrical connecting set

Fig. 73: Identifying 8-Pin SLK Plug



P00.19-2982-01

Fig. 74: Identifying 2-Pin SLK Coupling



P54.18-4056-01

Fig. 75: Identifying 2-Pin SLK Coupling



P00.19-2995-01

Fig. 76: Identifying 7-Pin SLK Coupling

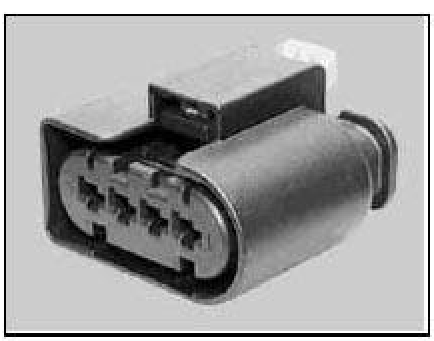
	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) orradio and navigation operating unit (APS) (A2/29)** Left front loudspeaker output	B 6 — A2 (V) — B 5	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 77: Identifying 8-Pin SLK Plug



P54.18-4047-01

Fig. 78: Identifying 3-Pin SLK Coupling



P54.18-4051-01

Fig. 79: Identifying 4-Pin SLK Coupling

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Radio (A2) orradio and navigation operating unit (APS) (A2/29)** Right rear loudspeaker output	B 2 — A2 (V) — B 1	Remove radio or operating unit and disconnect coupling B Radio: **ON** Carry out measurement at radio or operating unit, chamber B Adjust loudness control to "loud"	>0.2 V~	• Radio or APS radio and navigation operating unit • Values in order: Loudspeaker system or sound system

Fig. 80: Identifying 2-Pin SLK Plug


P54.18-4063-01

Fig. 81: Identifying 3-Pin SLK Coupling


P54.18-4064-01

Fig. 82: Identifying 4-Pin SLK Coupling


P54.18-4060-01

Fig. 83: Identifying 4-Pin SLK Coupling

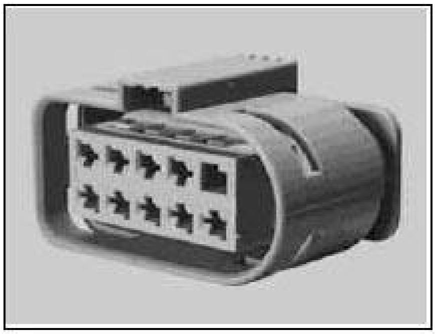


Fig. 84: Identifying 10-Pin SLK Coupling

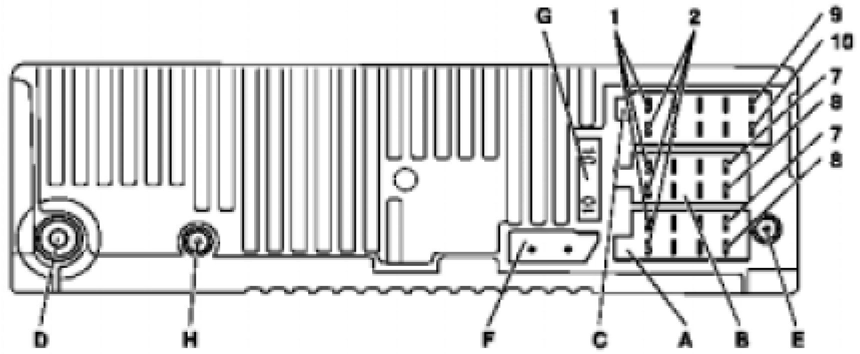
(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from sensor laminated contact plug	Spade-type sensor contact plug Design 97	**AR00.19-P-0120-01A**
AR	Remove contacts from sensor laminated contact coupling	Spade-type sensor contact coupling, Design 97	**AR00.19-P-0120-02A**
AR	Remove contacts from FIN sensor contact coupling		**AR00.19-P-0120-12A**

SENSOR LAMINATED CONTACT, CONNECTOR FAMILY - GF00.19-P-8101B

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

sensor laminated contact variant 2 connector family

A	*Connector A*
B	*Connector B*
C	*Connector C*
D	*FM/AM antenna input*
E	*GPS antenna input and direct voltage supply for GPS antenna*
F	*Connector for digital data bus (D2B)*
G	*Fuse*
H	*ZF output (can only be used with FM antenna systems with diversity function)*



P82.61-2187-05

Connector A

1	*Wheel speed signal*
2	*Diagnosis (K bus)*
3	*Mute signal from telephone (optional)*
4	*C. 30 (continuous positive)*
5	*Voltage supply for FM/AM antenna amplifier and on/off signal of left/right audio power amplifier (N40/3)*
6	*C. 58 d (lighting) (not used on models 208, 210, because via CAN)*
7	*C. 15 (switched positive)*
8	*C. 31 (ground)*

Connector B

1	*Right rear loudspeaker +*
2	*Right rear loudspeaker -*
3	*Right front loudspeaker +*
4	*Right front loudspeaker -*
5	*Left front loudspeaker +*
6	*Left front loudspeaker -*
7	*Left rear loudspeaker +*
8	*Left rear loudspeaker -*

Connector C

1	*CAN "High" (not used on models 163, 168, 170)*
2	*CAN "Low" (not used on models 163, 168, 170)*
3	*Signal for reversing (not used on models 208, 210, because via CAN)*
4	*Wake-up signal for components of digital data bus (D2B)*
5	*Terminal 30 for CD changer (A2/6)*
6	*Terminal 31 for CD changer (A2/6)*
7	*-*
8	*-*
9	*-*
10	*-*

Fig. 85: Identifying 2-Pin SLK Plug



P54.18-2310-01

Fig. 86: Identifying 2-Pin SLK Coupling

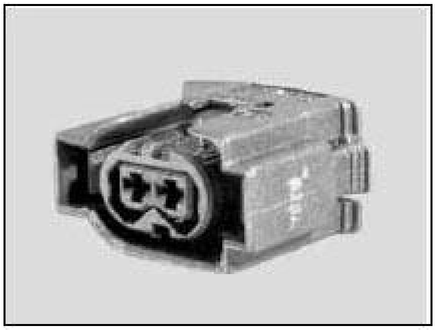


Fig. 87: Identifying 2-Pin SLK Coupling

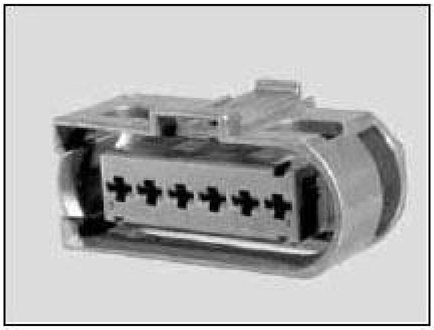


Fig. 88: Identifying 6-Pin SLK Coupling

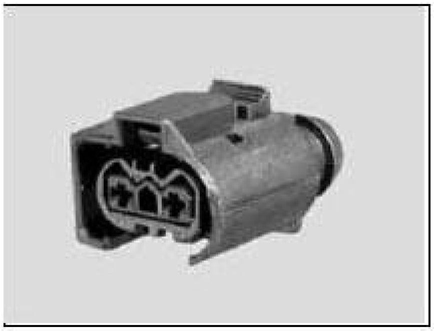


Fig. 89: Identifying 2-Pin SLK Coupling

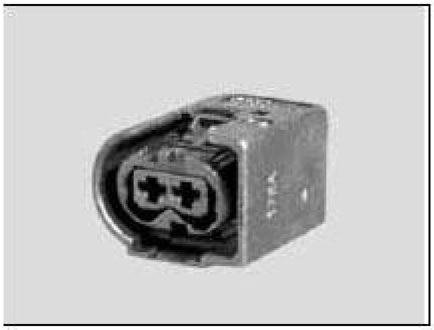
	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Cellular telephone and GPS roof antenna (A2/49) and cellular telephone and GPS antenna splitter (A2/57) Model 163**		Ignition: **ON** Free view of sky is necessary. Read out actual navigation values. [i] GPS antenna signals travel via the **cellular telephone and GPS splitter (A2/57)** to the radio and navigation unit (A2/56). Also check the telephone connected to A2/57 if necessary.	Display of vehicle position in degrees of longitude and latitude and display of "visible" and available satellites.	• Atmospheric interruptions, signal shadows and reflections from buildings can affect GPS reception. ⇒1.1
1.1	Measure voltage supply of cellular telephone and GPS splitter (A2/57) at A2/56	(E) A2/56 V Inner conductor (E)	Connector E disconnected at A2/56. Measurement takes place at A2/56. Ignition: **ON** A2/56: **ON** Use adapter cable 140 589 22 63 00 for inner conductor.	approx. 5 V	• A2/56 Value in order: ⇒1.2
1.2	Measure voltage supply of cellular telephone and GPS roof antenna (A2/49) at A2/57	Housing A2/57 V Inner conductor	Connector E connected at A2/56. Coaxial connector connected at A2/57 (bush with inscription: GPS). Coaxial connector disconnected at A2/57 (bush with inscription: Antenna). Measurement takes place at center connection of A2/57. Ignition: **ON** A2/56: **ON**	approx. 5 V	• Coaxial cable between A2/56 and A2/57 • A2/57 Value in order: ⇒1.3
1.3	Check coaxial cable and cellular telephone and GPS roof antenna (A2/49) for short-circuit	Shield A2/57 Ω Inner conductor	Ignition: **OFF** Disconnect coaxial connector at A2/57 (bush with inscription: Antenna). Measurement takes place at plug of disconnected antenna cable towards A2/49	> 5 Ω	• Coaxial cable from A2/57 to A2/49 • A2/49 Value in order but complaint persists: • Open-circuit in coaxial cable between A2/57 and A2/49 • A2/49

Fig. 90: Identifying 2-Pin SLK Plug



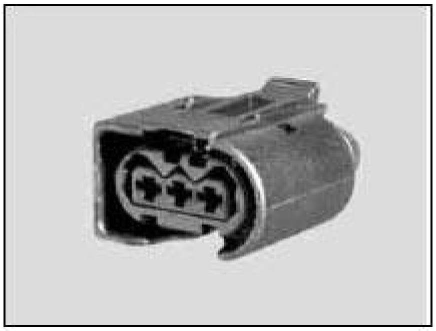
P54.18-2307-01

Fig. 91: Identifying 5-Pin SLK Coupling



P54.18-2304-01

Fig. 92: Identifying 2-Pin SLK Coupling



P54.18-2303-01

Fig. 93: Identifying 3-Pin SLK Coupling



P00.19-2996-01

Fig. 94: Identifying 4-Pin SLK Coupling



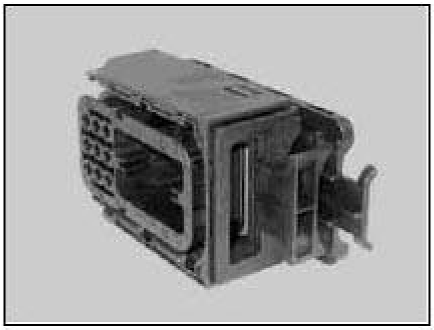
P00.19-2997-01

Fig. 95: Identifying 3-Pin SLK Coupling



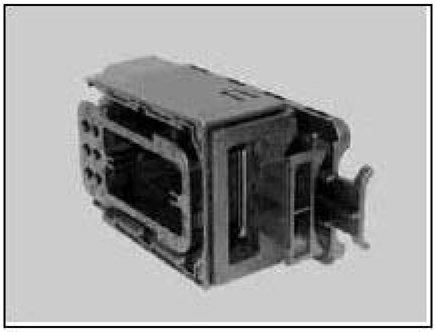
P54.18-2449-01

Fig. 96: Identifying 2X3-Pin SLK Coupling



P00.19-3517-01

Fig. 97: Identifying 53-Pin SLK Coupling



P00.19-3516-01

Fig. 98: Identifying 58-Pin SLK Coupling

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from sensor laminated contact plug	Spade-type sensor contact plug Variant 2	**AR00.19-P-0120-01B**
AR	Remove contacts from sensor laminated contact coupling	Spade-type sensor contact coupling, variant 2	**AR00.19-P-0120-02B**

MICRO QUADLOCK SYSTEM CONNECTOR FAMILY - GF00.19-P-8102A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Micro Quadlock system variant 1 connector family



P54.18-2260-01

Fig. 99: Identifying 2 X 26-Pin MQS Coupling



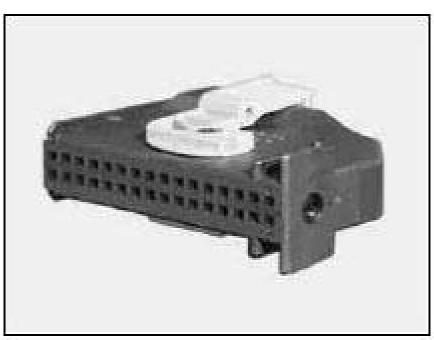
P54.18-2261-01

Fig. 100: Identifying 2 X 20-Pin MQS Coupling



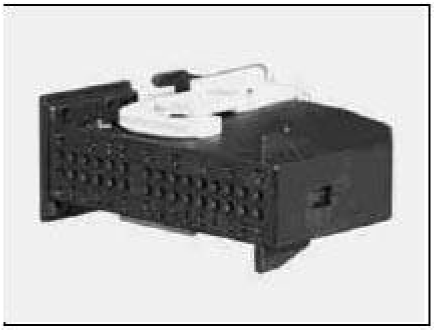
P54.18-2274-01

Fig. 101: Identifying 24-Pin MQS Coupling



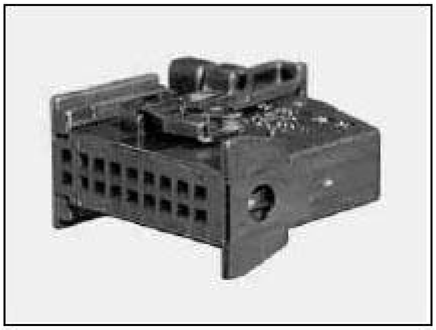
P54.18-2273-01

Fig. 102: Identifying 32-Pin MQS coupling



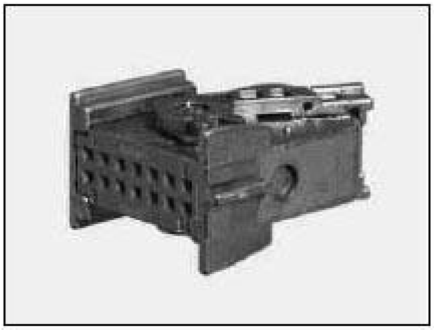
P54.18-2271-01

Fig. 103: Identifying 30-Pin MQS Coupling



P54.18-2269-01

Fig. 104: Identifying 18-Pin MQS Coupling



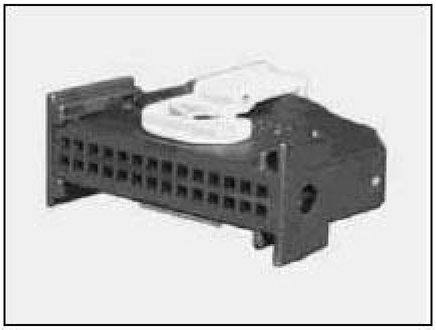
P54.18-2272-01

Fig. 105: Identifying 14-Pin MQS Coupling



P54.18-2268-01

Fig. 106: Identifying 12-Pin MQS Coupling



P54.18-2266-01

Fig. 107: Identifying 28-Pin MQS Coupling



P54.18-2265-01

Fig. 108: Identifying 18-Pin MQS Coupling

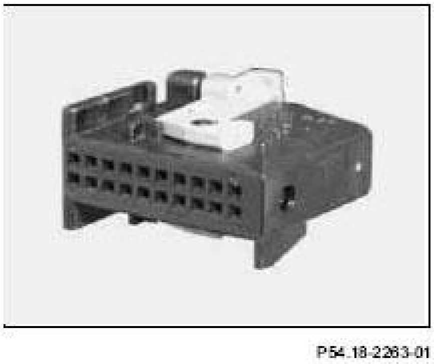


Fig. 109: Identifying 20-Pin MQS Coupling

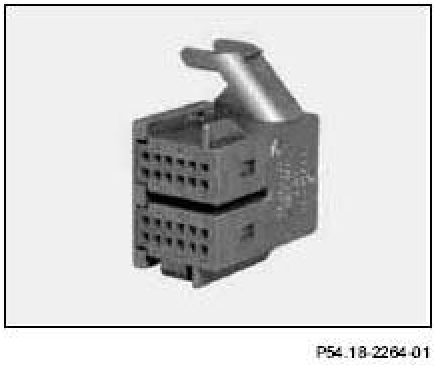
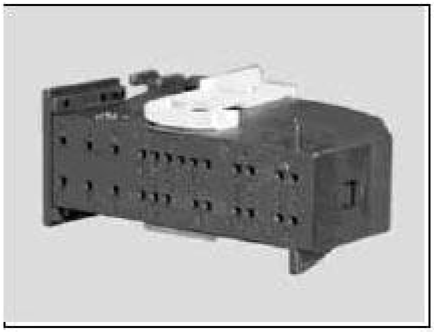


Fig. 110: Identifying 24-Pin MQS Coupling



Fig. 111: Identifying 12+4-Pin MQS Coupling



P54.18-2270-01

Fig. 112: Identifying 25-Pin MQS Coupling



P54.18-2228-01

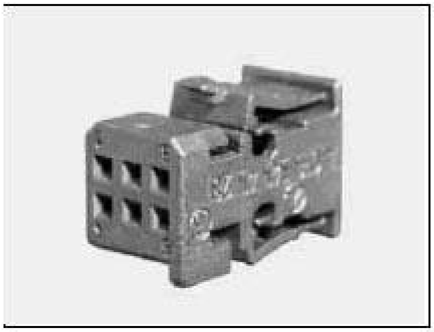
Fig. 113: Identifying 8-Pin MQS Coupling

1. Cover
2. Bulb housing
3. Bulb
4. Connector
5. Locking mechanism
6. Fog lamp insert



P82.10-2833-06

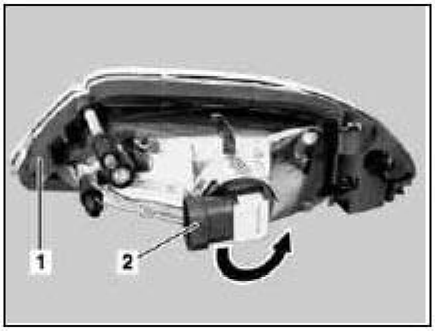
Fig. 114: Identifying 6-Pin MQS Coupling



P54.18-2226-01

Fig. 115: Identifying 6-Pin MQS Coupling

1 Fog lamps
2 Bulb with plug



P82.10-2781-01

Fig. 116: Identifying 2-Pin MQS Coupling



P54.18-2302-01

Fig. 117: Identifying 2-Pin MQS Coupling

E1	*Left front lamp unit*
E1m1	*Left headlamp range adjustment motor*
E2	*Right front lamp unit*
E2m1	*Right headlamp range adjustment motor*



Fig. 118: Identifying 8-Pin MQS Coupling

1	*Connector*
2	*Connector*
E1	*Left front lamp unit*
E2	*Right front lamp unit*
E1n1	*Xenon headlamp control unit*
E2n1	*Xenon headlamp control unit*



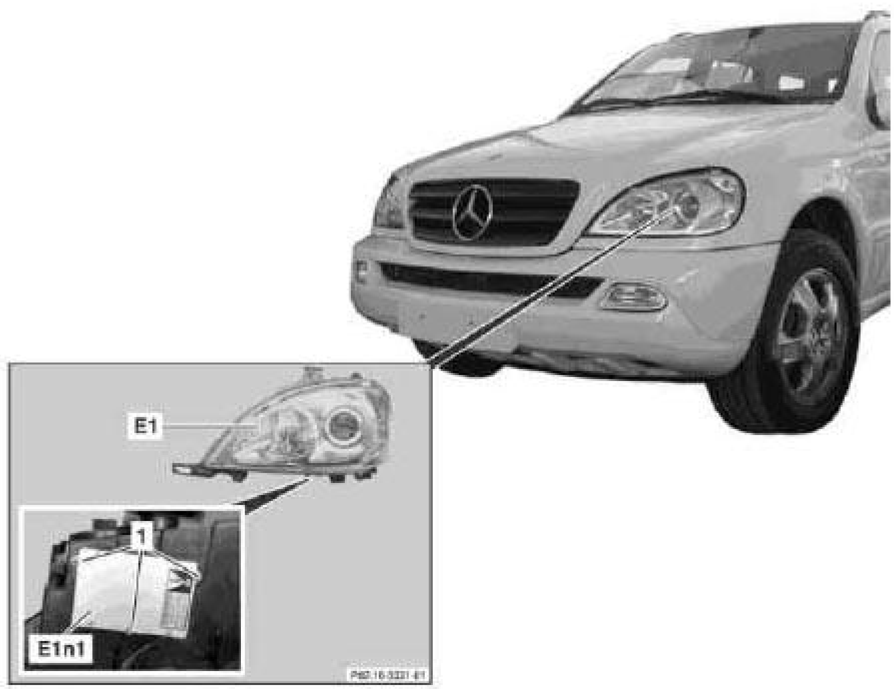
Fig. 119: Identifying 2 X 7-Pin MQS Coupling



P54.18-2299-01

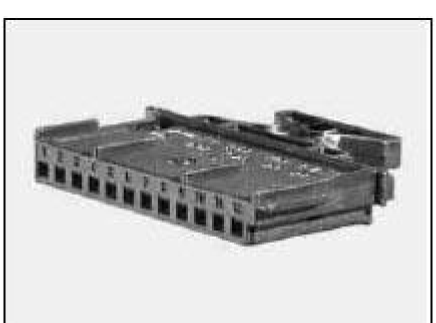
Fig. 120: Identifying 10-Pin MQS Coupling, (Yellow)

1	*Bolts*
E1	*Left front lamp unit*
E1n1	*Xenon headlamp control unit*



P82.10-3322-06

Fig. 121: Identifying 8-Pin MQS Coupling



P54.18-2297-01

Fig. 122: Identifying 12-Pin MQS Coupling



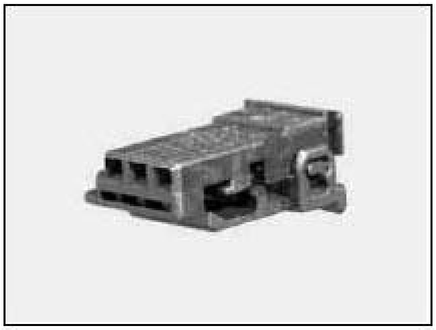
P54.18-2246-01

Fig. 123: Identifying 3-Pin MQS Coupling



P54.18-2245-01

Fig. 124: Identifying 10-Pin MQS Coupling



P54.18-2244-01

Fig. 125: Identifying 3-Pin MQS Coupling

1	Cover
2	Bolt
3	Fog lamp



Fig. 126: Identifying 4-Pin MQS Coupling

1	Lever
2	Fog lamp
3	Electrical connector
4	Grommets

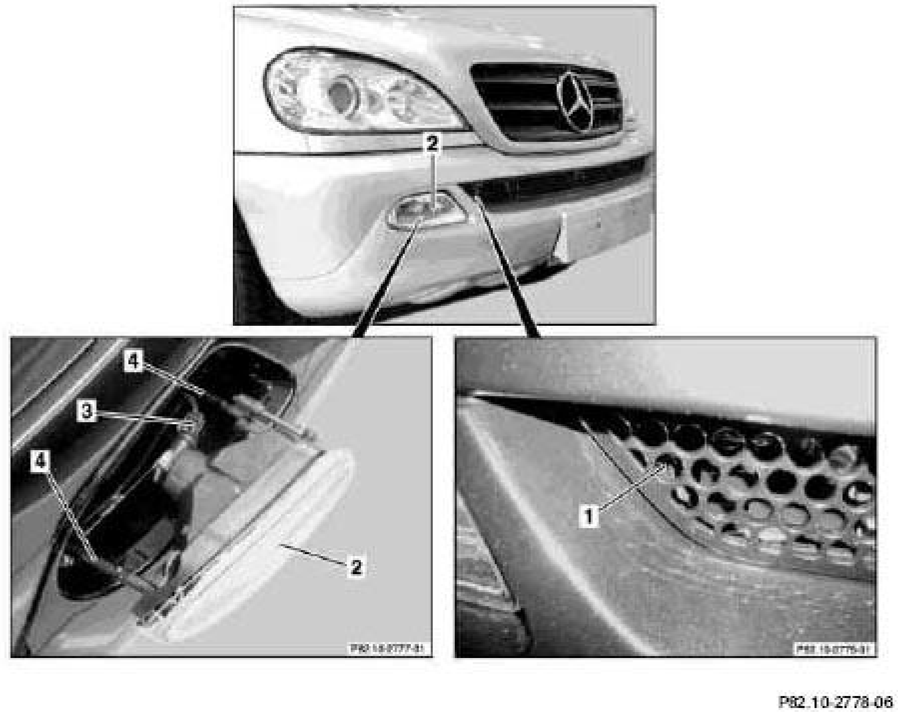
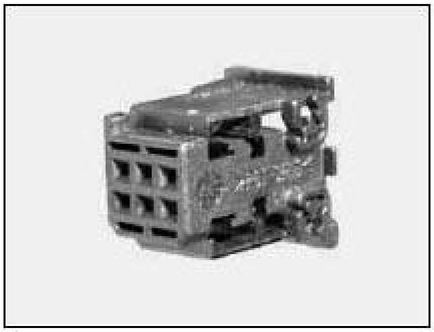


Fig. 127: Identifying 10-Pin MQS Coupling



P54.18-2241-01

Fig. 128: Identifying 5-Pin MQS Coupling



P54.18-2240-01

Fig. 129: Identifying 6-Pin MQS Coupling



P54.18-2447-01

Fig. 130: Identifying 8-Pin MQS Coupling

1 Water hose
2 Retaining clip
3 Screws
4 Cover
5 Telescopic nozzle

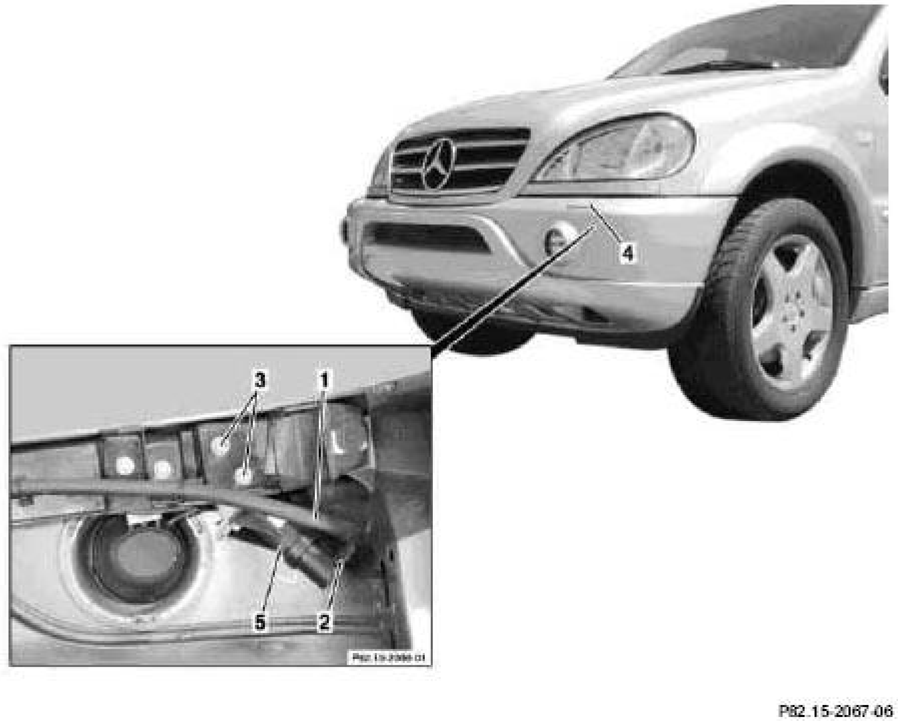


Fig. 131: Identifying 3-Pin MQS Coupling



Fig. 132: Identifying 8-Pin MQS Coupling

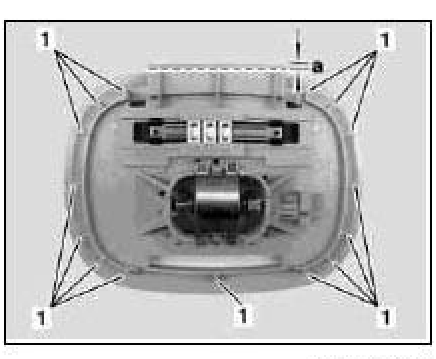
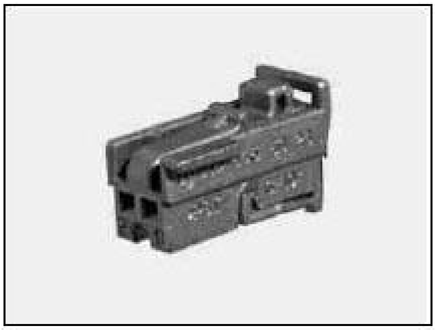


Fig. 133: Identifying 10-Pin MQS Coupling



P54.18-2234-01

Fig. 134: Identifying 2-Pin MQS Coupling



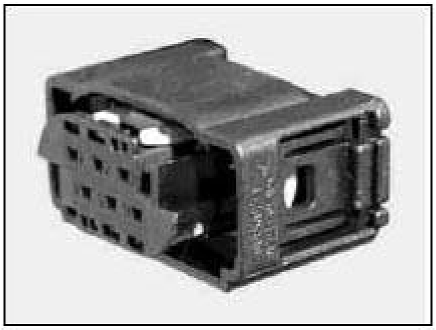
P54.18-2232-01

Fig. 135: Identifying 4-Pin MQS Coupling



P54.18-2230-01

Fig. 136: Identifying 4-Pin MQS Coupling



P54.18-2229-01

Fig. 137: Identifying 6-Pin MQS Coupling



P54.18-2231-01

Fig. 138: Identifying 4-Pin MQS Coupling



P54.18-2237-01

Fig. 139: Identifying 2-Pin MQS Coupling



Fig. 140: Identifying 3-Pin MQS Coupling



Fig. 141: Identifying 40-Pin MQS Coupling

1	*Nut on wiper motor shaft*
2	*Wiper linkage*
3	*Screws*
M6/1	*Wiper motor*
X88/2	*Connector*

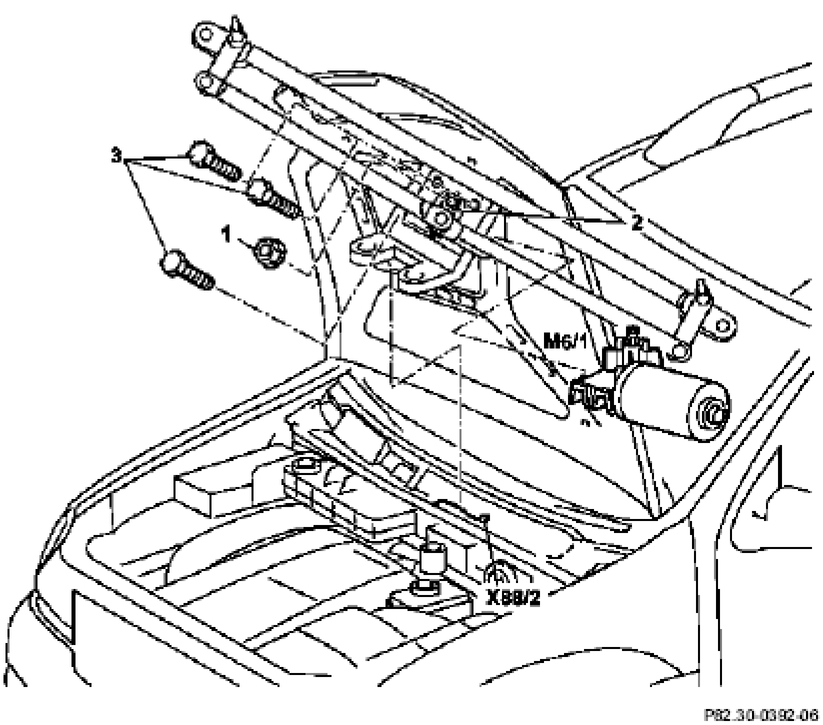


Fig. 142: Identifying 3-Pin MQS Plug

1	Connector for washing water line
2	Rear wiper motor screw
3	Connector
M6/4	Rear window wiper motor

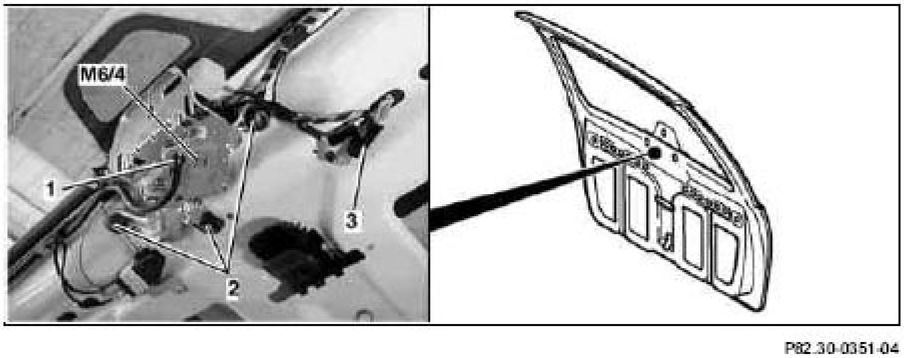


Fig. 143: Identifying 4-Pin MQS Plug



Fig. 144: Identifying 6-Pin MQS Plug

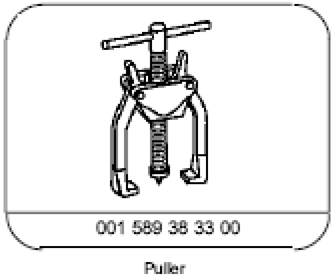


Fig. 145: Identifying 4-Pin MQS Plug

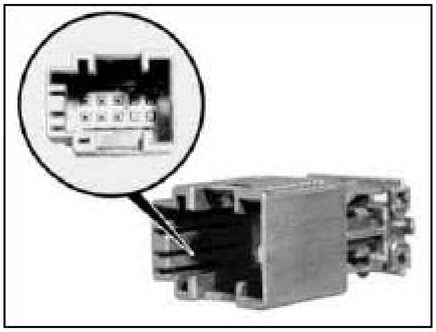


Fig. 146: Identifying 10-Pin MQS Plug



Fig. 147: Identifying 6-Pin MQS Plug

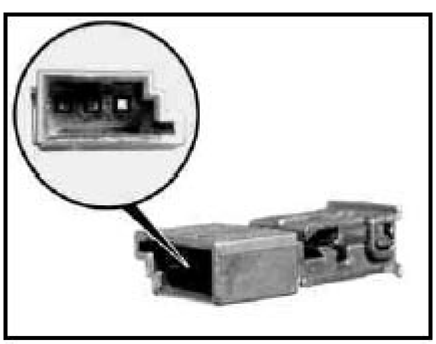


Fig. 148: Identifying 3-Pin MQS Plug

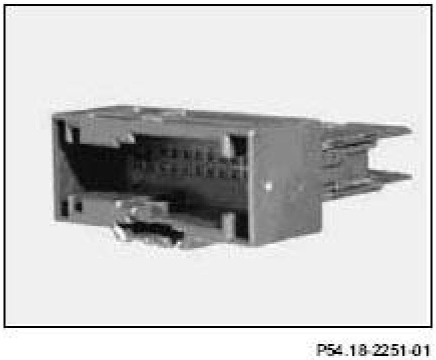


Fig. 149: Identifying 28-Pin MQS Plug

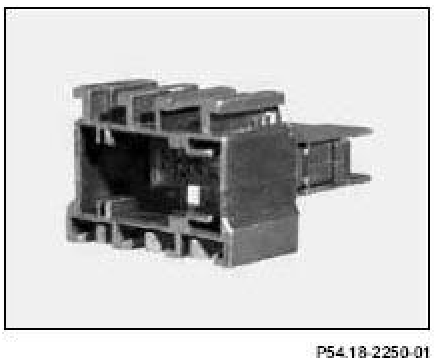


Fig. 150: Identifying 18-Pin MQS Plug

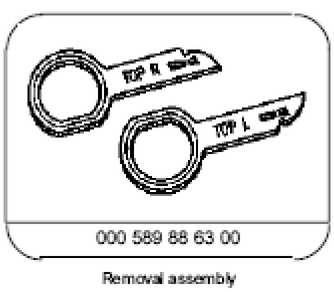
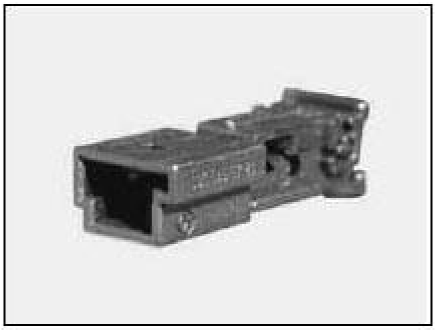


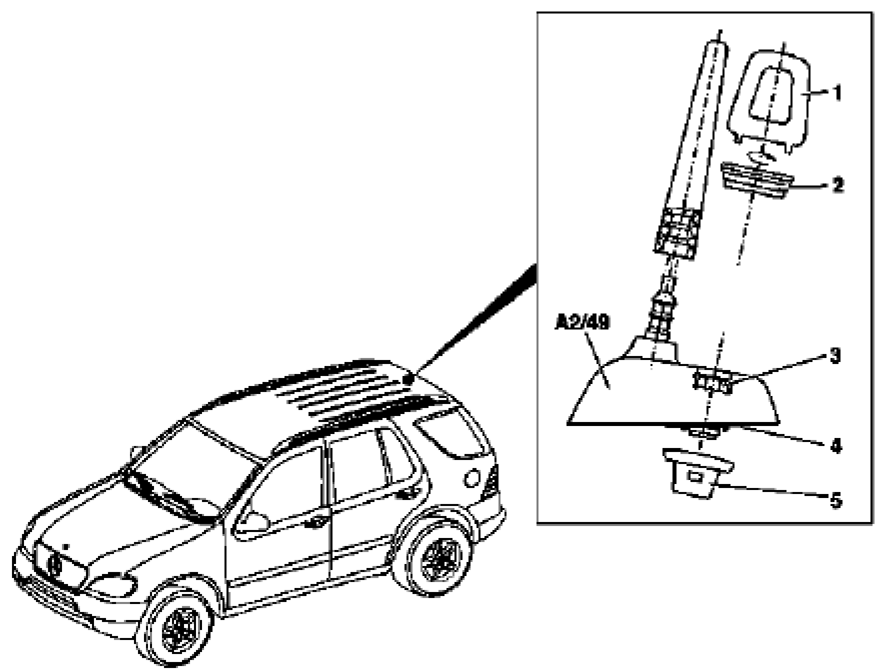
Fig. 151: Identifying 2-Pin MQS Plug



P54.18-2248-01

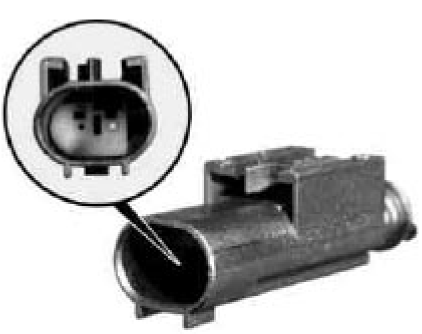
Fig. 152: Identifying 2-Pin MQS Plug

1	*Special wrench*
2	*Cover*
3	*Threaded sleeve*
4	*Foam gasket*
5	*Rubber grommet*
A2/49	*Telephone and GPS roof antenna*



P82.61-2534-06

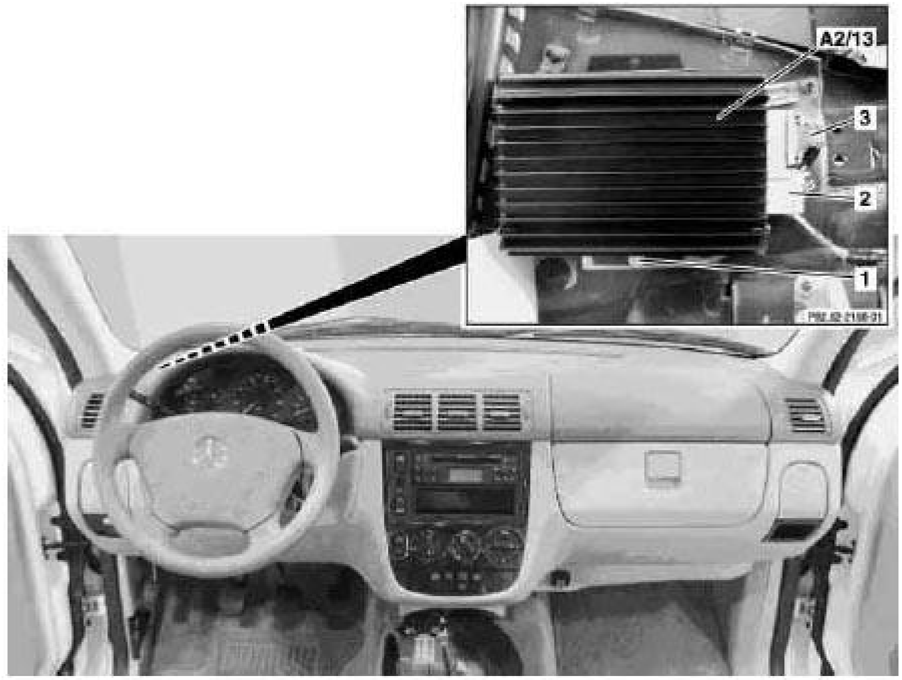
Fig. 153: Identifying 20-Pin MQS Plug



P54.18-2257-01

Fig. 154: Identifying 2-Pin MQS Plug

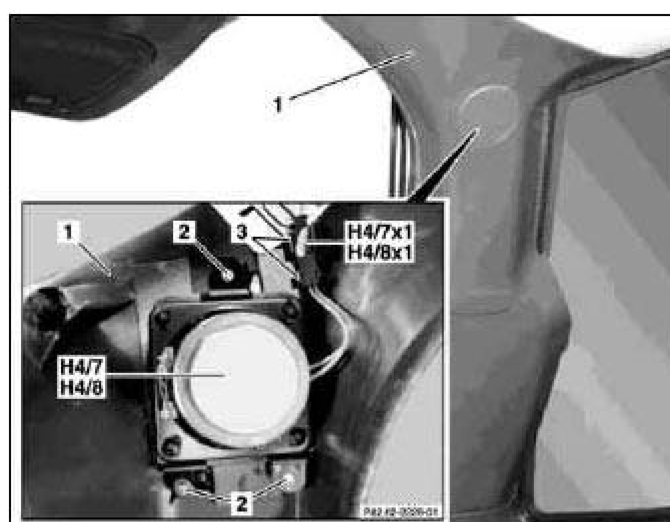
1	*Bolt*
2	*Connector*
3	*Connector*
A2/13	*Sound amplifier*



P82.62-2169-06

Fig. 155: Identifying 2-Pin MQS Coupling

1	*Rear roof frame paneling*
2	*Screws*
3	*Bracket*
H4/7	*Left rear speaker*
H4/7x1	*Left rear speaker connector*
H4/8	*Right rear speaker*
H4/8x1	*Right rear speaker connector*



P82.62-2230-11

Fig. 156: Identifying 5/2-Pin MQS, MCP Coupling

1	Left front seat
2	Bolts
H4/17	Bass module loudspeaker
H4/17x1	Bass module speaker connector



Fig. 157: Identifying 6-Pin MQS Coupling

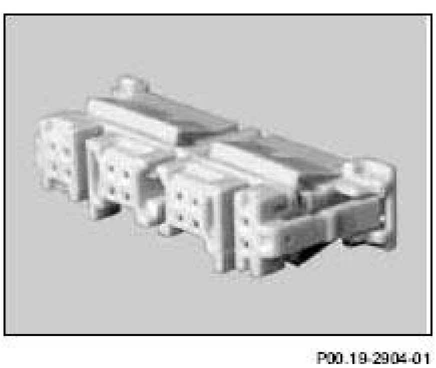
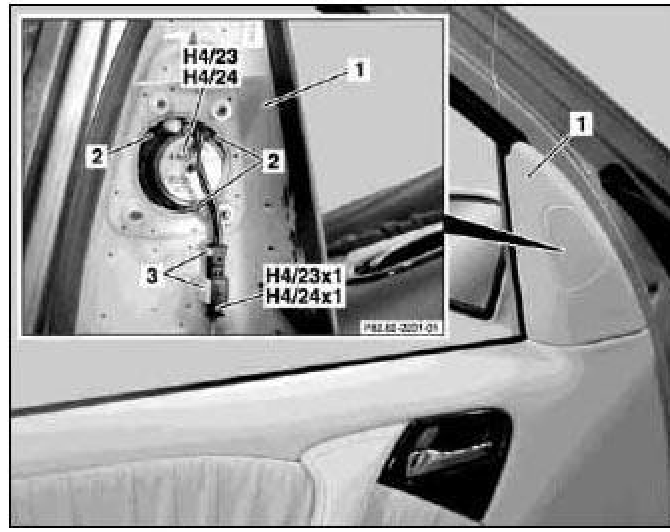


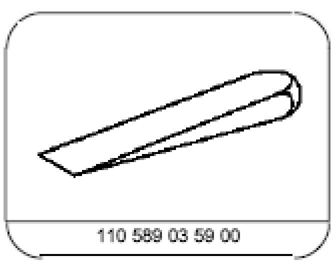
Fig. 158: Identifying 14-Pin MQS Coupling

1	*Mirror triangle*
2	*Retaining clamps*
3	*Bracket*
H4/23	*Left front door speaker, mirror triangle*
H4/23x1	*Left front door speaker connector, mirror triangle*
H4/24	*Right front door speaker, mirror triangle*
H4/24x1	*Right front door speaker connector, mirror triangle*



P82.62-2232-11

Fig. 159: Identifying 12-Pin MQS Coupling



Assembly wedge

Fig. 160: Identifying 4-Pin MQS Plug

1	Electrical connector
2	Screw
3	Loudspeaker housing
4	Screw
H4/3	Left rear door speaker
H4/4	Right rear door speaker

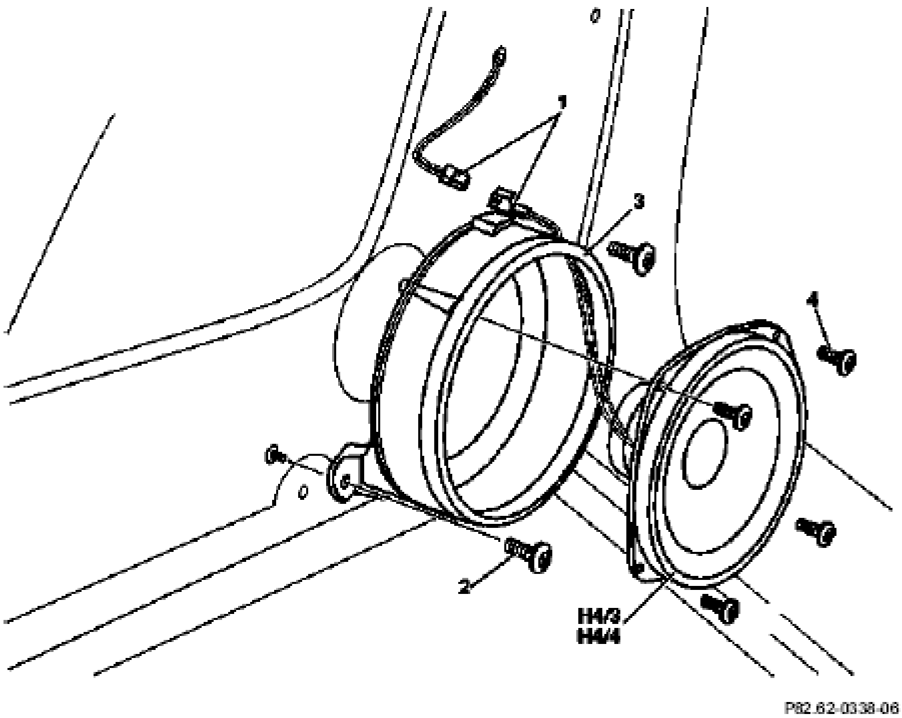


Fig. 161: Identifying 4-Pin MQS Plug

1	Bolt
2	Plug-in wiring plug connection
3	Plug-in wiring plug connection
4	Plug-in wiring plug connection
5	Bracket
A2/18	AM/FM amplifier

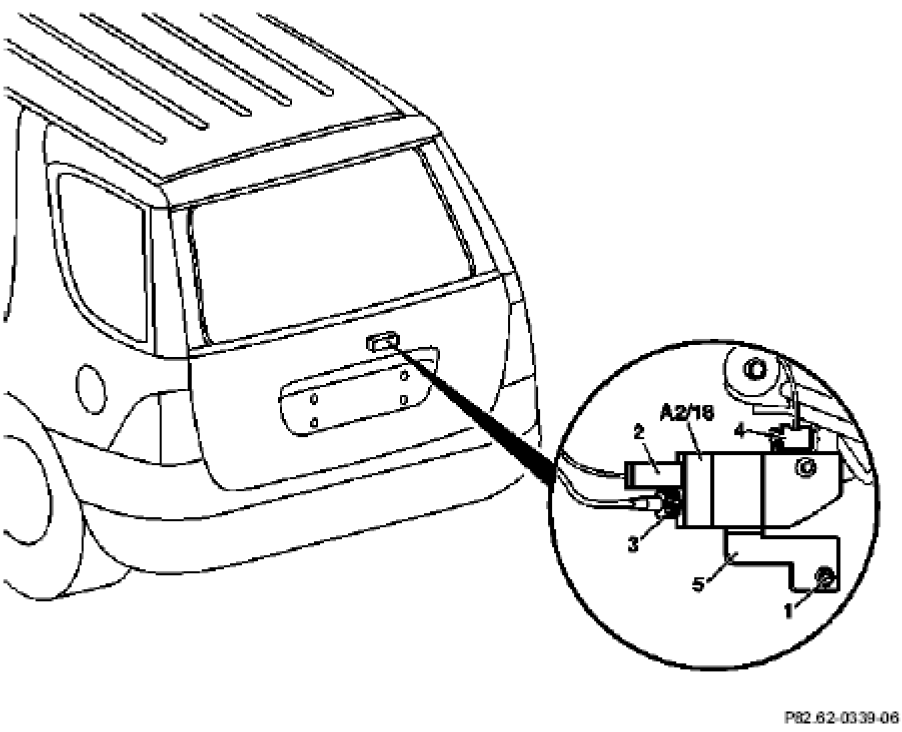


Fig. 162: Identifying 2-Pin MQS Plug

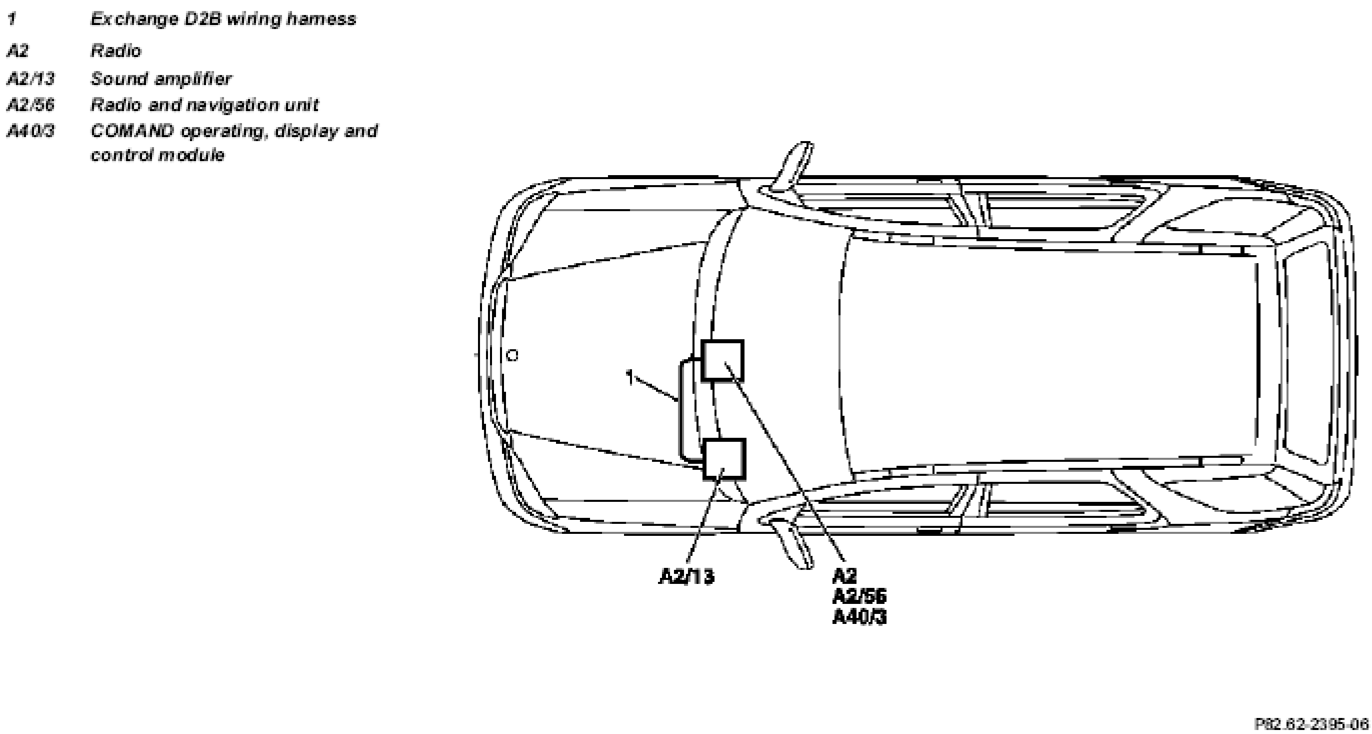


Fig. 163: Identifying 12-Pin MQS Plug

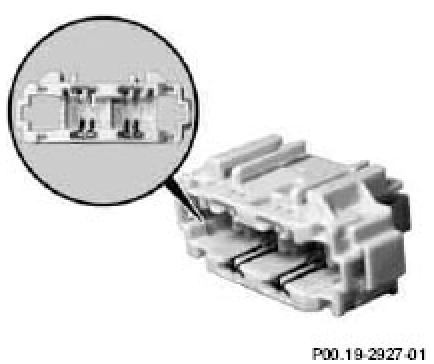


Fig. 164: Identifying 14-Pin MQS Plug

1	Cover
2	Tommy screw
3	Bracket
4	Bolts
A2/6	CD player with changer (in trunk)

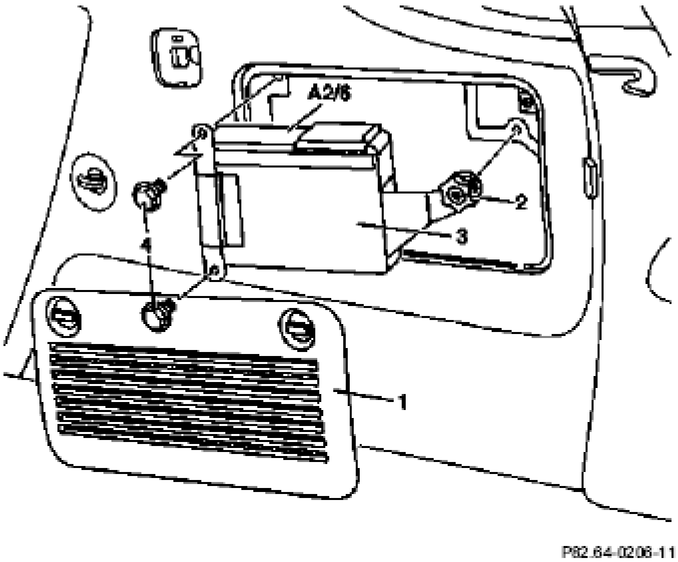


Fig. 165: Identifying 4-Pin MQS Plug

3	Bracket
5	Electrical line
6	Retaining clips
7	Bolts
8	Electrical connector
A2/6	CD player with changer (in trunk)

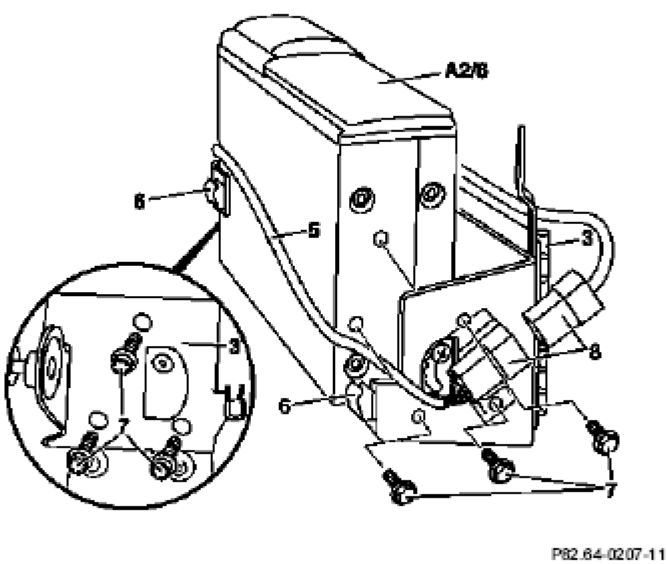


Fig. 166: Identifying 2-Pin MQS Plug



Fig. 167: Identifying 6-Pin MQS Coupling

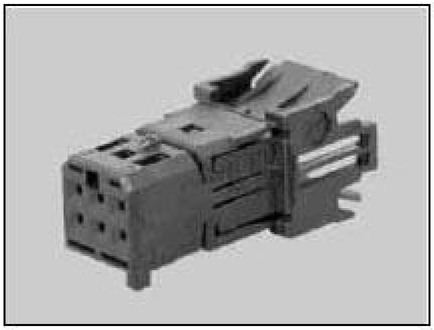


Fig. 168: Identifying 6-Pin MQS Coupling

1 Exchange D2 B-wiring harness
2 Heater housing

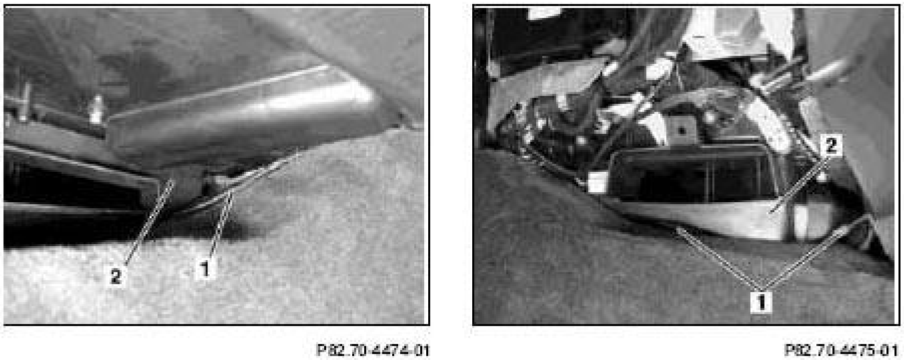


Fig. 169: Identifying 4-Pin MQS Coupling

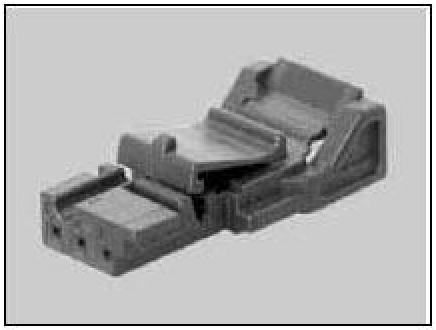


Fig. 170: Identifying 3-Pin MQS Coupling



Fig. 171: Identifying 3-Pin MQS Coupling

1 *Exchange D2 B-wiring harness*
2 *Heater housing*

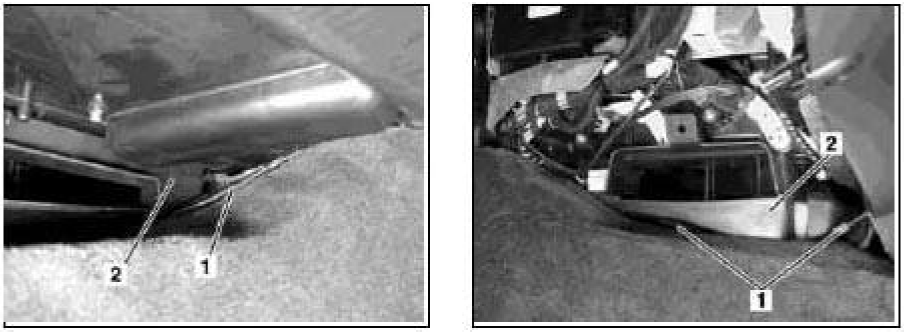


Fig. 172: Identifying 4-Pin MQS Coupling



P00.19-2950-01

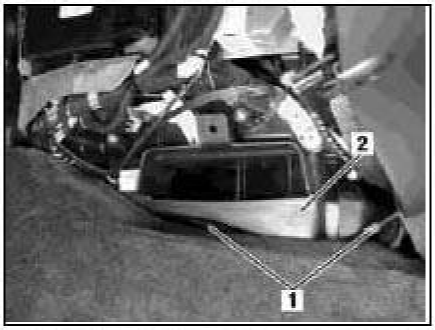
Fig. 173: Identifying 8-Pin MQS Coupling



P00.19-2952-01

Fig. 174: Identifying 3-Pin MQS Coupling

1 *Exchange D2B wiring harness*
2 *Heater housing*



P82.70-4475-01

Fig. 175: Identifying 4-Pin MQS Coupling

1	*Bolt*
2	*Bolt*
3	*Electrical connections*
A2/5	*Radio antenna splitter*

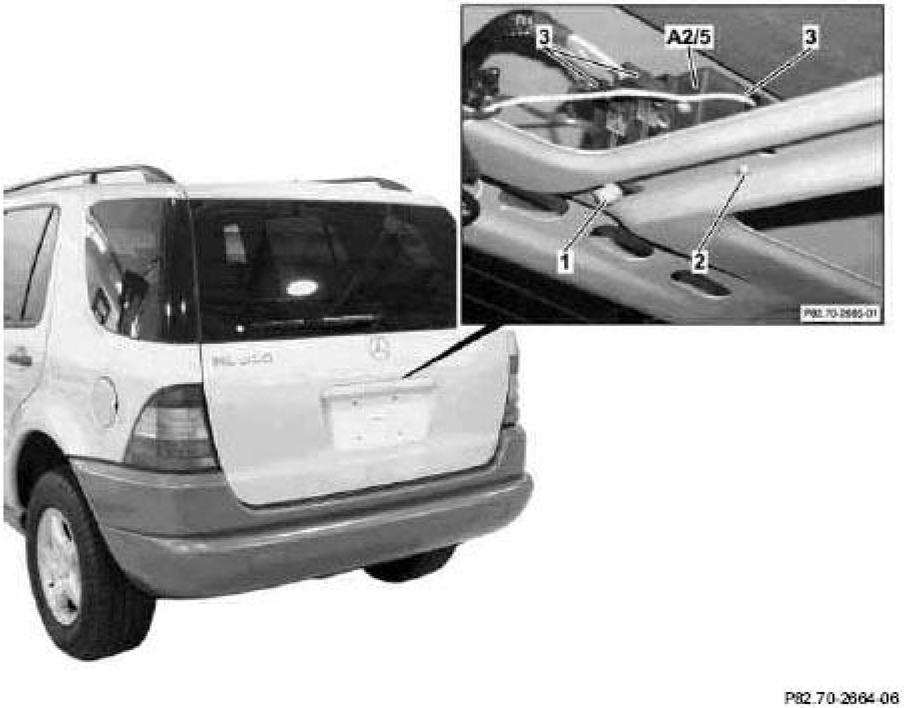


Fig. 176: Identifying 10-Pin MQS Coupling

B26	*Electronic compass*



Fig. 177: Identifying 3/2-Pin, MQS Coupling



Fig. 178: Identifying 3/2-Pin, MQS/MCP Coupling

1	Right front seat
2	Connector
3	Conductive coupling D2B
4	Antenna plug
5	Bolts
A35/8	E-call control module

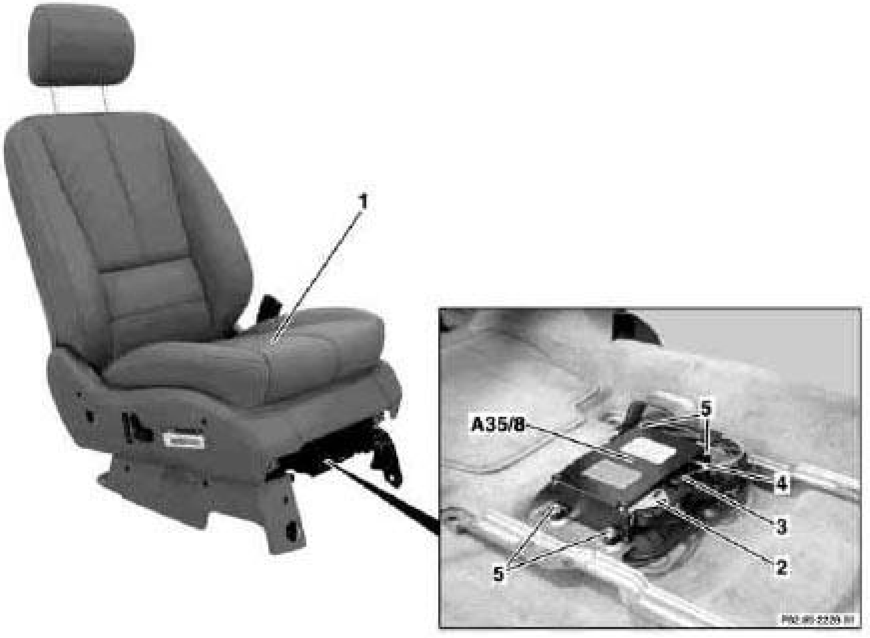


Fig. 179: Identifying 14-Pin, MQS Coupling

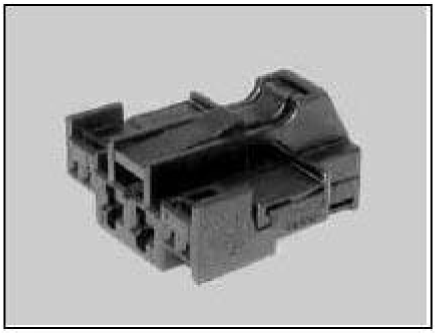


Fig. 180: Identifying 4-Pin MQS Coupling



P00.19-3504-01

Fig. 181: Identifying 3-Pin MQS Coupling



P00.19-3511-01

Fig. 182: Identifying 6-Pin MQS/MCP Coupling

Arrow: *Position of adjusting screw*



P82.10-3633-01

Fig. 183: Identifying 5-Pin MQS Coupling

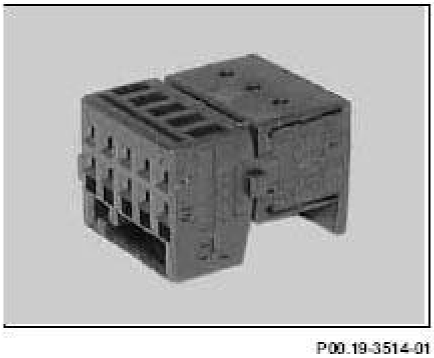


Fig. 184: Identifying 10-Pin MQS Coupling

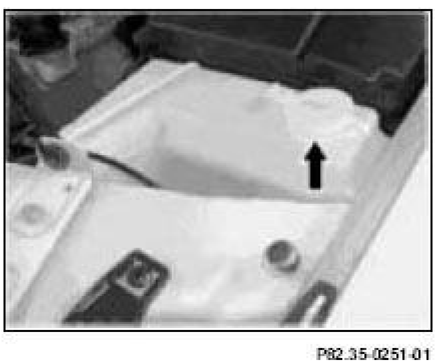


Fig. 185: Identifying 14-Pin MQS Coupling

4	*Adapter wiring harness*
7	*Radio mating connector*
8	*CAN bus adapter connector*
A2/29	*Radio and navigation operating unit*
C	*Black 10-pin connector*
Y	*Telephone connector (not required)*
or	*Green back-up lamp lead*

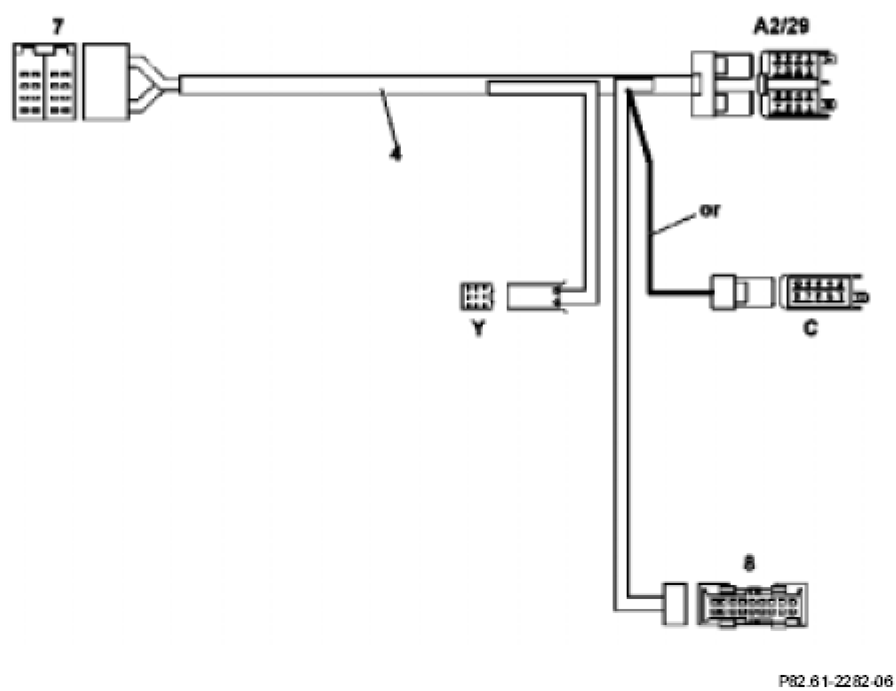
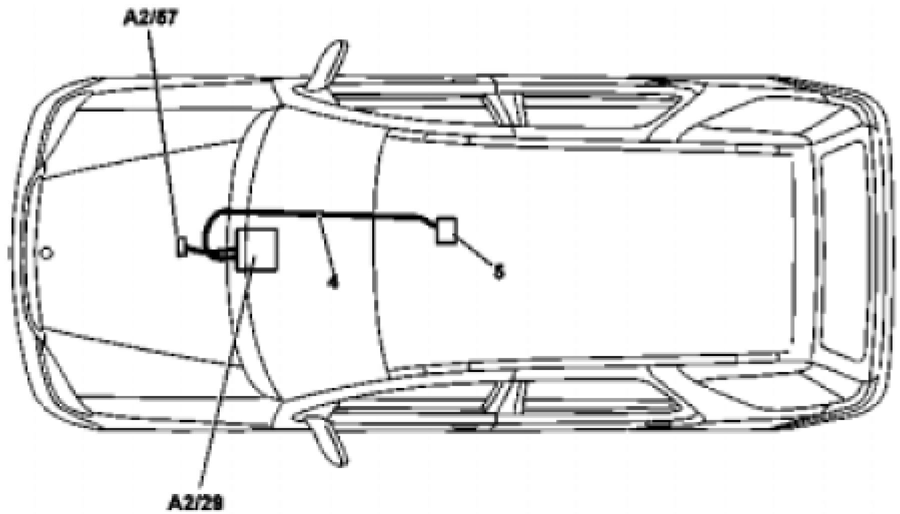


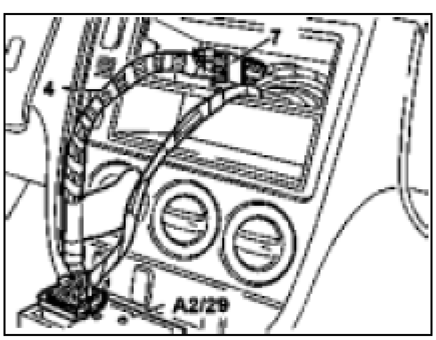
Fig. 186: Identifying 5-Pin MQS Plug

4	*Adapter wiring harness*
5	*CAN bus adapter*
A2/29	*Radio and navigation operating unit*
A2/57	*GPS/telephone antenna splitter*



P82.61-2280-06

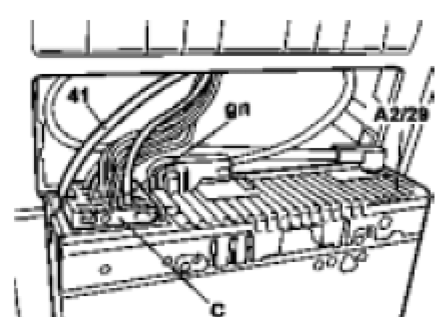
Fig. 187: Identifying 14-Pin MQS Plug



P82.61-2283-01

Fig. 188: Identifying 8/4-Pin, MQS/JPT Plug

gn	*Green back-up lamp signal lead*



P82.61-2287-01

Fig. 189: Identifying 12-Pin MQS Coupling

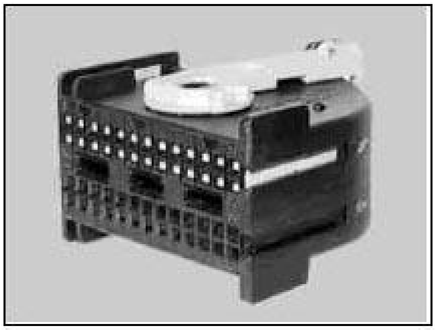


Fig. 190: Identifying 52-Pin MQS Coupling

ⓘ	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contracts from Micro Quadlock System plug	Micro Quadlock System plug Variant 1	**AR00.19-P-0120-03A**
AR	Remove contacts from Micro Quadlock System coupling	Micro Quadlock System coupling, variant 1	**AR00.19-P-0120-04A**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**
AR	Remove contacts from Multi Contact Point (MCP) coupling		**AR00.19-P-0120-09A**

MICRO QUADLOCK SYSTEM CONNECTOR FAMILY - GF00.19-P-8102B

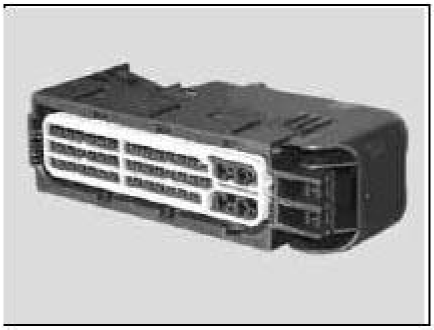
MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Micro Quadlock system variant 2 connector family



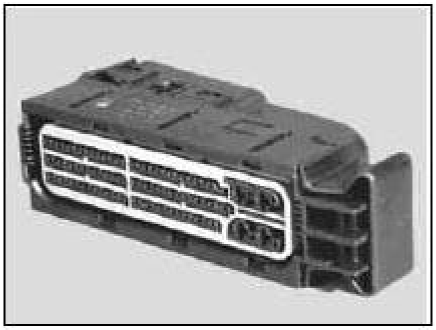
P54.18-2331-01

Fig. 191: Identifying 38-Pin MQS, JPT Coupling



P54.18-2321-01

Fig. 192: Identifying 47-Pin MQS, MCP Coupling



P54.18-2320-01

Fig. 193: Identifying 47-Pin MQS, MCP Coupling

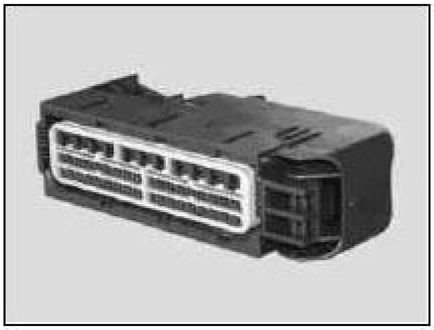


Fig. 194: Identifying 47-Pin MQS, MCP Coupling

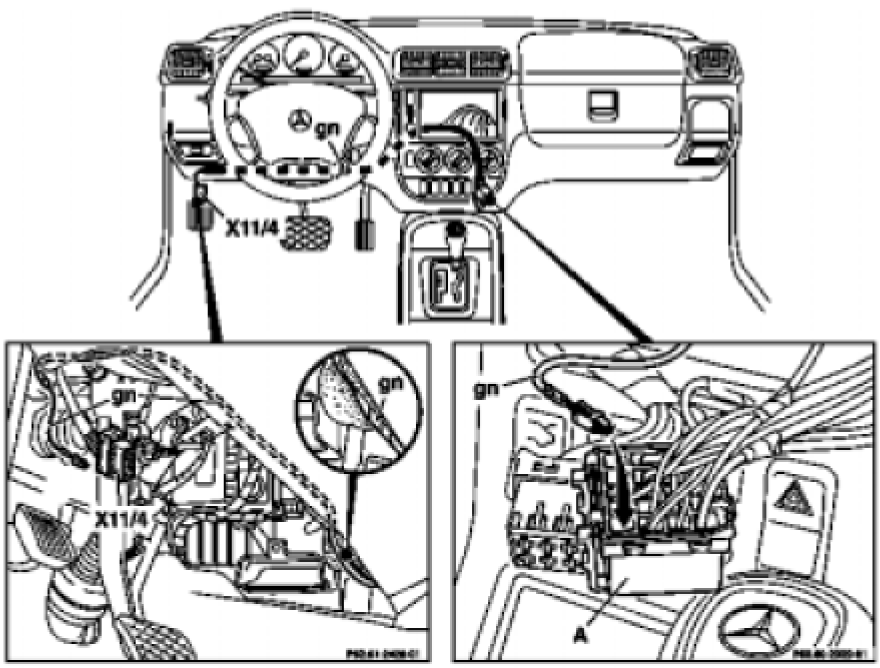


Fig. 195: Identifying 8-Pin MQS Plug

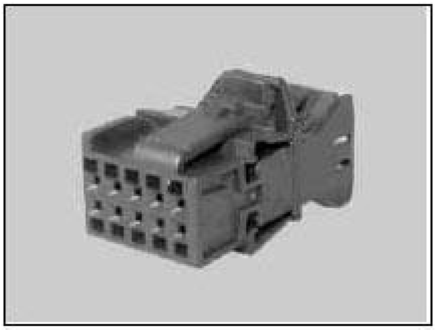


Fig. 196: Identifying 10-Pin MQS Coupling

(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from Micro Quadlock System coupling	Micro Quadlock System, coupling variant 2	**AR00.19-P-0120-04B**
AR	Remove contacts from Micro Quadlock System plug	Micro Quadlock System plug Variant 2	**AR00.19-P-0120-03B**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**
AR	Remove contacts from Multi Contact Point (MCP) coupling		**AR00.19-P-0120-09A**

SIEMENS ELO CONNECTOR FAMILY - GF00.19-P-8103A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

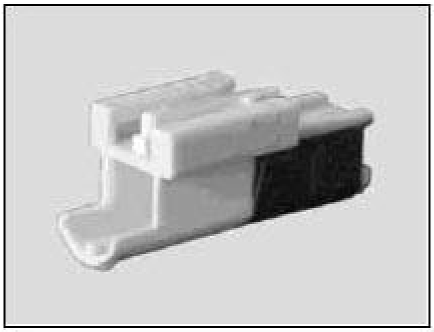


Fig. 197: Identifying 2-Pin Siemens ELO Plug



Fig. 198: Identifying 2-Pin Siemens ELO Coupling

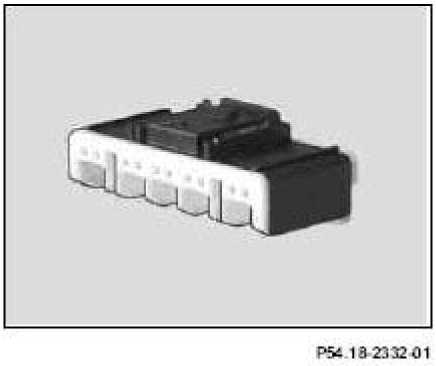


Fig. 199: Identifying 10-Pin Siemens ELO Coupling

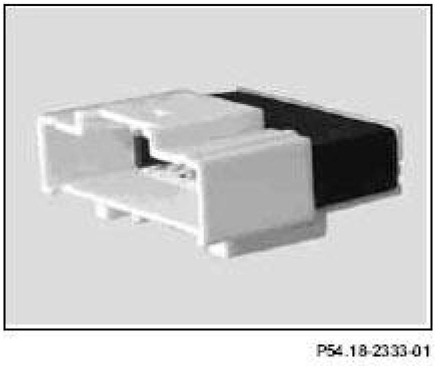


Fig. 200: Identifying 10-Pin Siemens ELO Plug

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**

i	Notes regarding plug connections		AH00.19-P-1000-06A
AR	Remove contacts from Siemens ELO plug		AR00.19-P-0120-24A
AR	Remove contacts from Siemens ELO coupling		AR00.19-P-0120-23A

E 95 CONNECTOR FAMILY - GF00.19-P-8104A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



Fig. 201: Identifying 29-Pin E95 Coupling

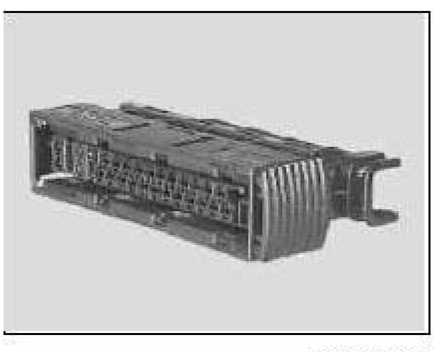
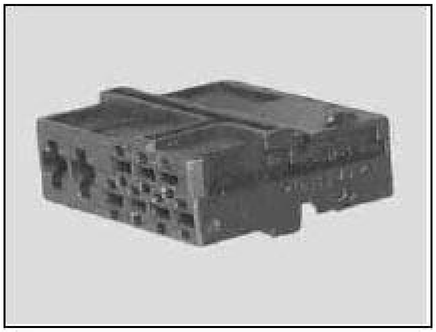


Fig. 202: Identifying 27-Pin E95 Coupling



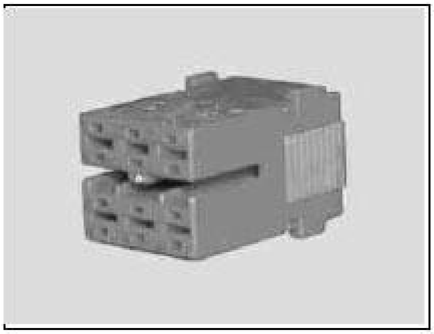
P54.18-2509-01

Fig. 203: Identifying 9-Pin E95 Coupling



P54.18-2510-01

Fig. 204: Identifying 4-Pin E95 Coupling



P54.18-2514-01

Fig. 205: Identifying 6-Pin E95 Coupling

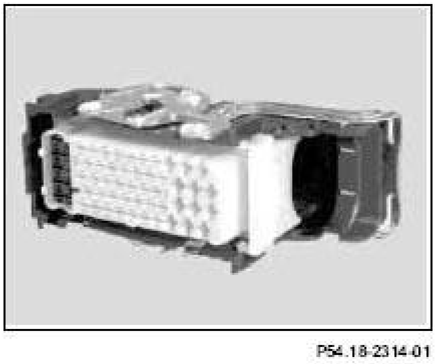


Fig. 206: Identifying 61-Pin E95, JPT Coupling

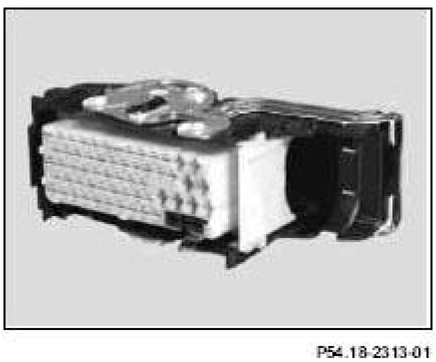
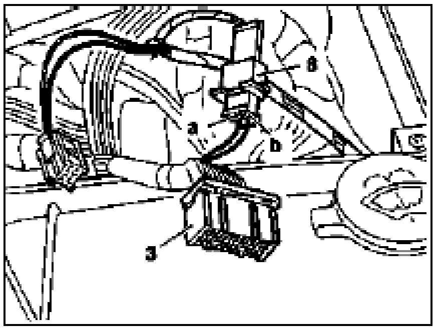


Fig. 207: Identifying 57-Pin E95, JPT Coupling

(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from E95 coupling		**AR00.19-P-0120-05A**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**

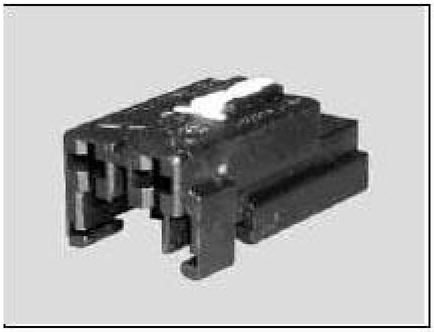
MICRO TIMER 3 CONNECTOR FAMILY - GF00.19-P-8105A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



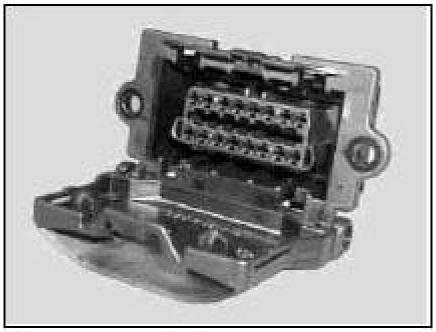
P82.20-0440-01

Fig. 208: Identifying 2-Pin MT-3 Coupling



P54.18-2617-01

Fig. 209: Identifying 4-Pin MT-3, JPT Coupling



P54.18-2620-01

Fig. 210: Identifying 16-Pin MT-3 Coupling

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**

i	Notes regarding plug connections		AH00.19-P-1000-06A
AR	Remove contacts from Micro Timer 3 coupling		AR00.19-P-0120-06A
AR	Remove contacts from Junior Power Timer coupling		AR00.19-P-0120-07A

JUNIOR POWER TIMER CONNECTOR FAMILY - GF00.19-P-8106A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

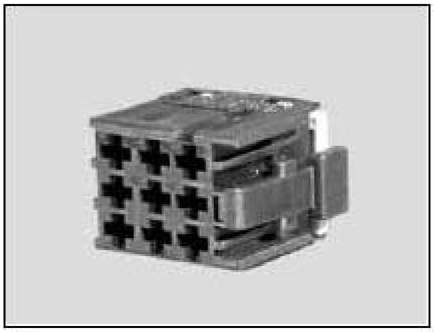


Fig. 211: Identifying 9-Pin JPT Coupling

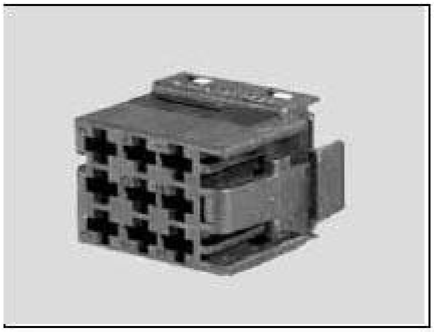


Fig. 212: Identifying 9-Pin JPT Coupling



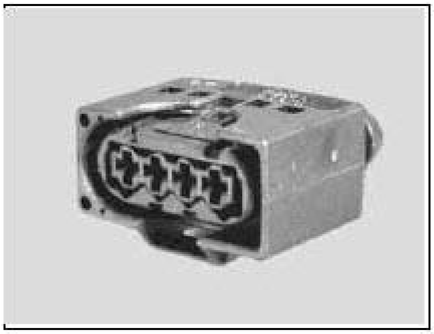
P54.18-2330-01

Fig. 213: Identifying 4-Pin JPT Coupling



P54.18-2328-01

Fig. 214: Identifying 8-Pin JPT Coupling



P54.18-2319-01

Fig. 215: Identifying 4-Pin JPT Coupling



Fig. 216: Identifying 3-Pin JPT Coupling



Fig. 217: Identifying 5-Pin JPT Coupling

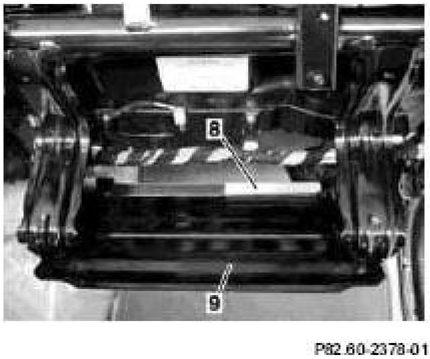


Fig. 218: Identifying 4-Pin JPT Coupling

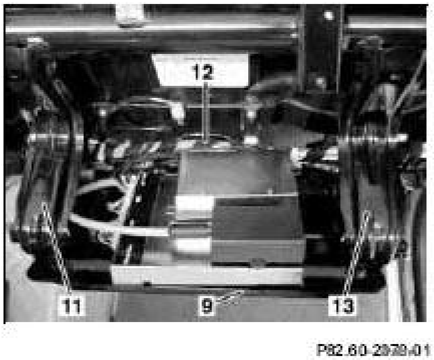


Fig. 219: Identifying 9-Pin JPT, E95 Coupling

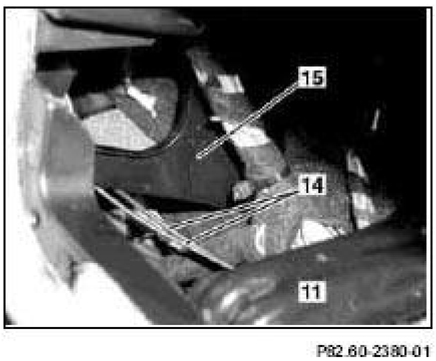


Fig. 220: Identifying 7-Pin JPT, SPT Coupling

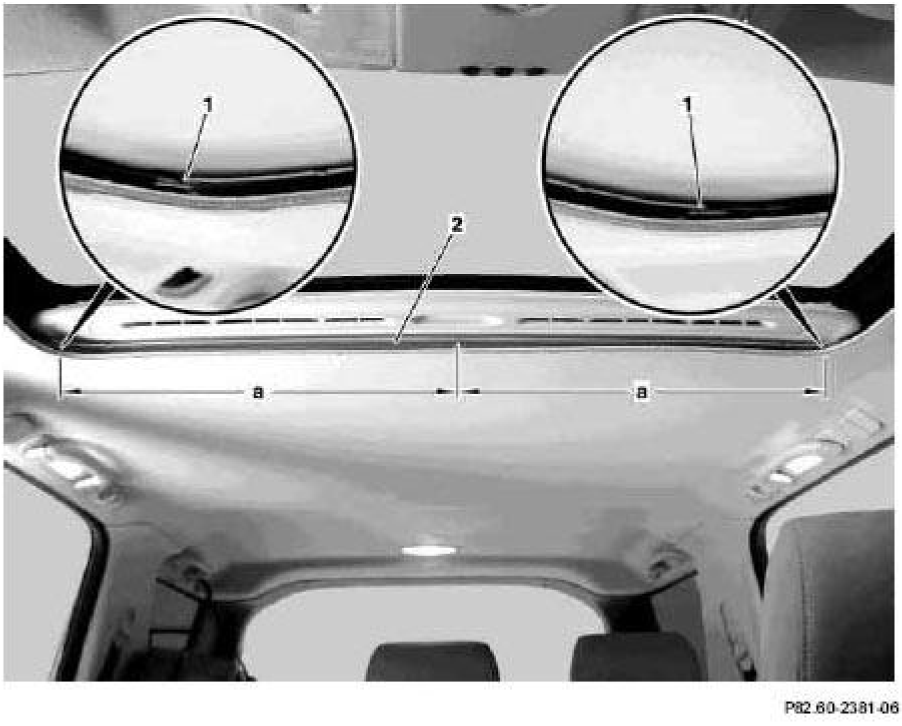


Fig. 221: Identifying 4-Pin JPT, LSK Coupling

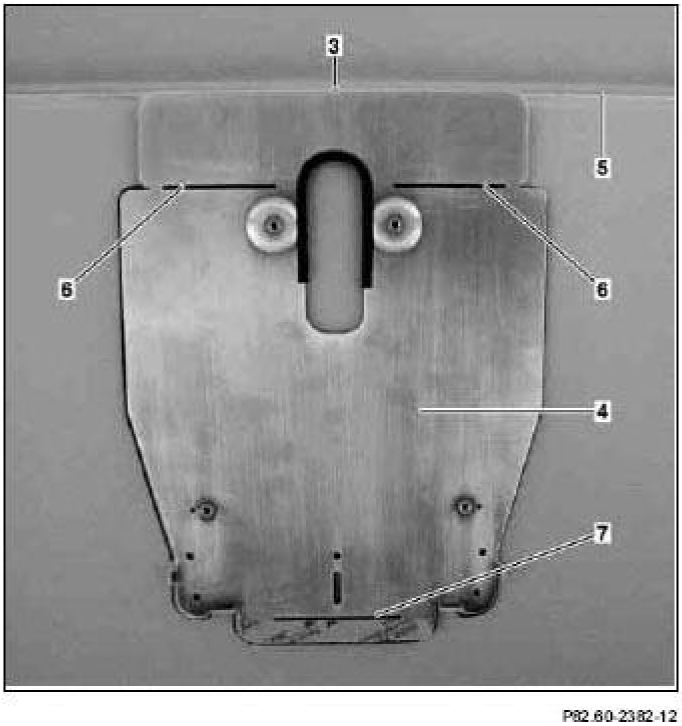


Fig. 222: Identifying 4-Pin JPT, MPT Coupling

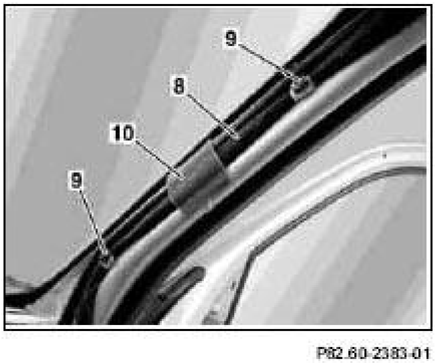


Fig. 223: Identifying 38-Pin JPT, MQS Coupling

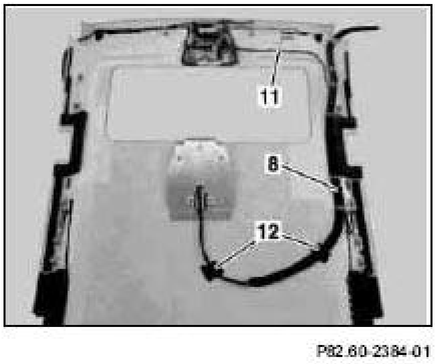


Fig. 224: Identifying 61-Pin E95, JPT Coupling

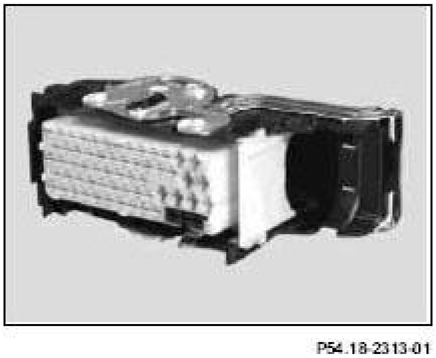


Fig. 225: Identifying 57-Pin E95, JPT Coupling

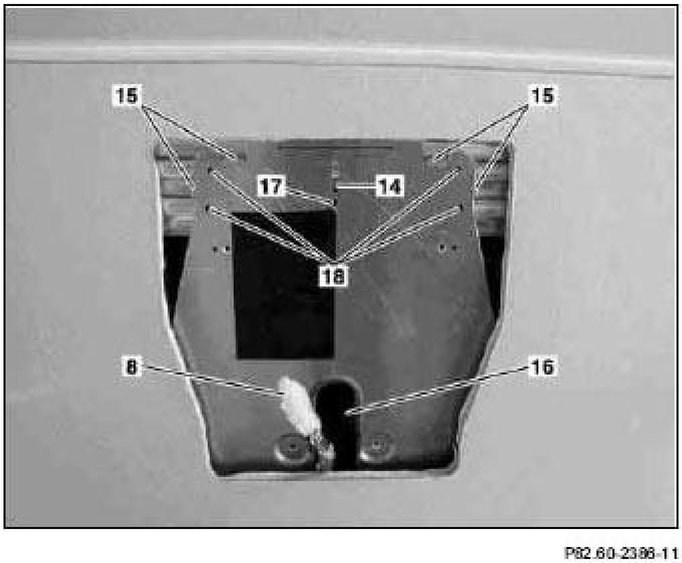


Fig. 226: Identifying 4-Pin JPT Coupling

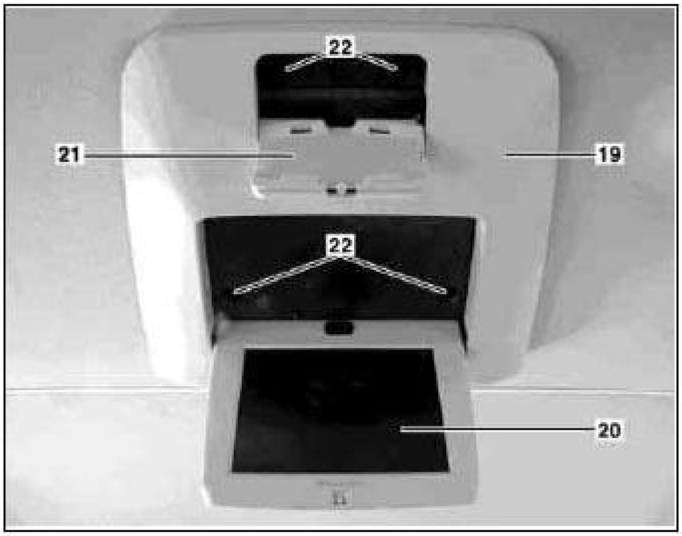


Fig. 227: Identifying 1-Pin JPT Coupling

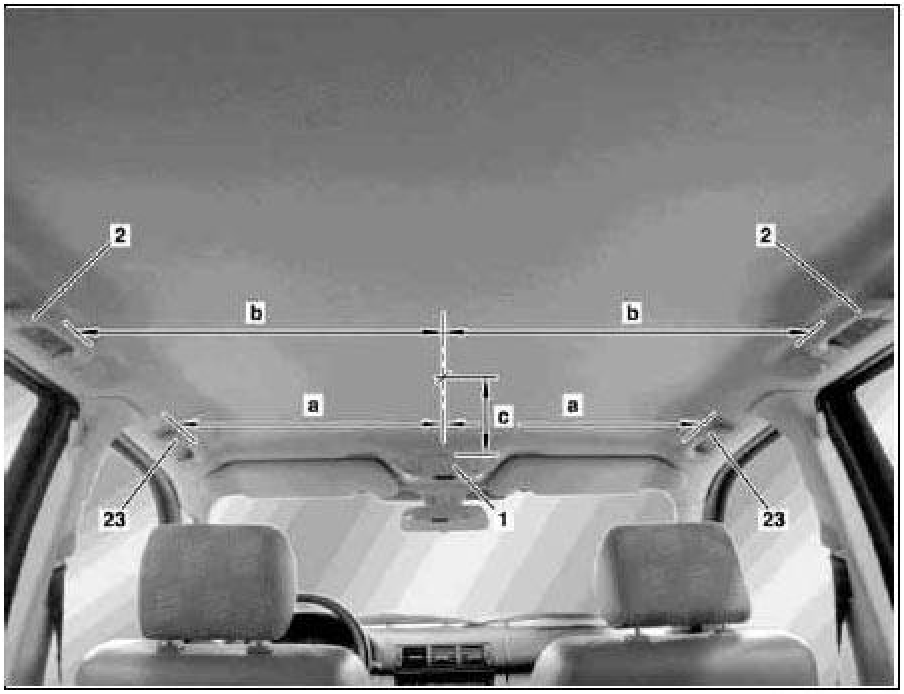


Fig. 228: Identifying 3-Pin JPT Coupling

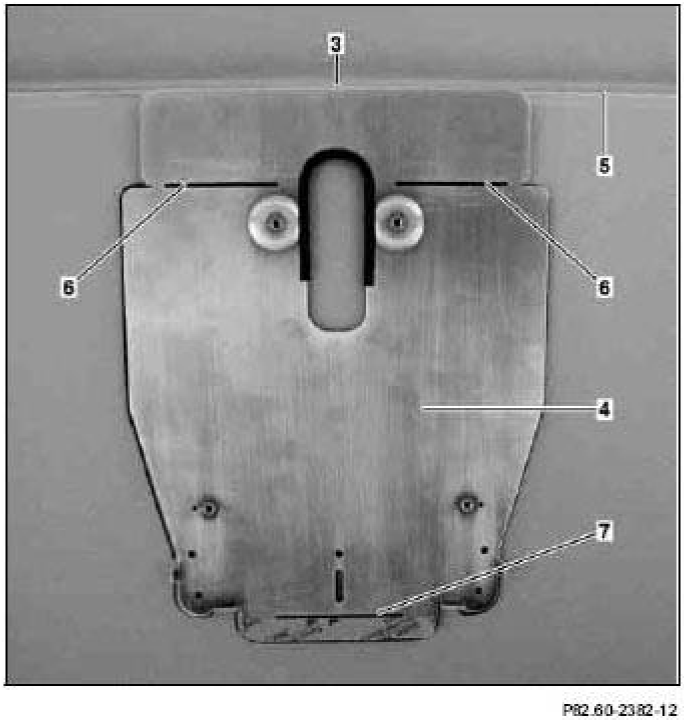


Fig. 229: Identifying 2-Pin JPT Coupling

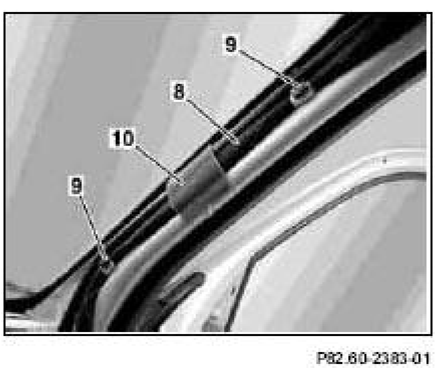


Fig. 230: Identifying 2-Pin JPT Coupling

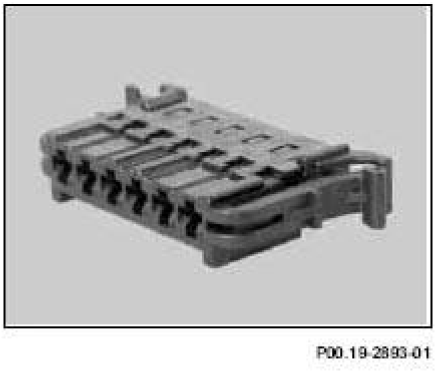


Fig. 231: Identifying 6-Pin JPT Coupling

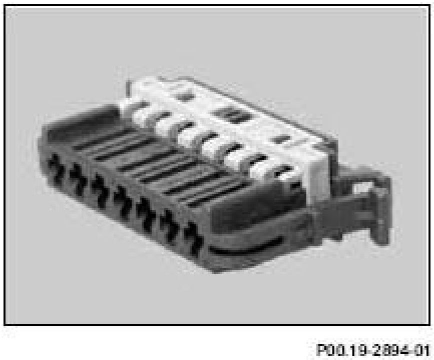


Fig. 232: Identifying 7-Pin JPT Coupling

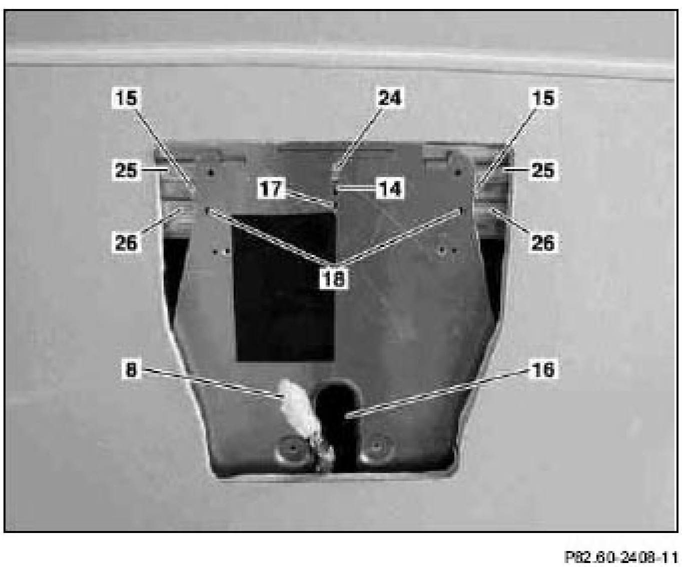


Fig. 233: Identifying 4-Pin JPT Coupling

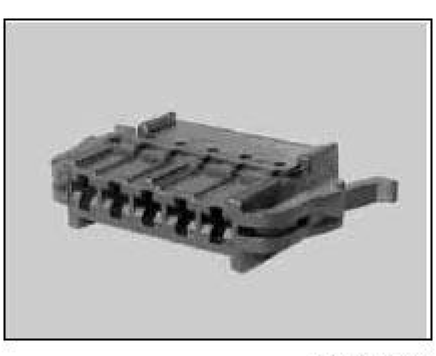


Fig. 234: Identifying 5-Pin JPT Coupling

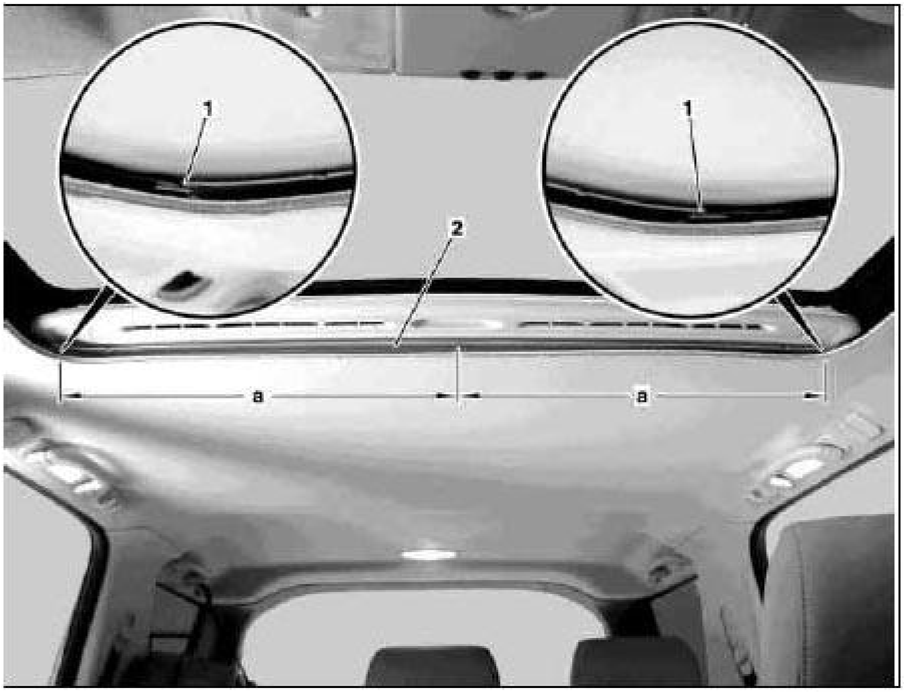


Fig. 235: Identifying 2-Pin JPT Coupling

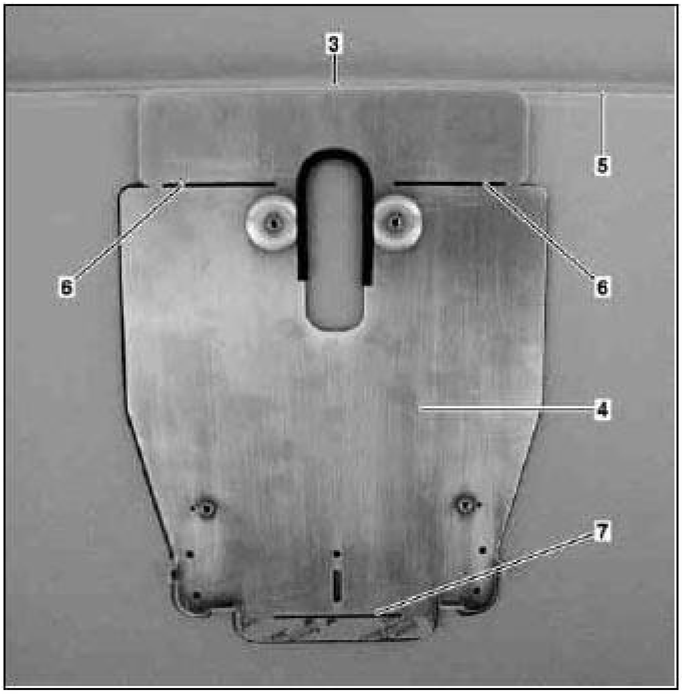


Fig. 236: Identifying 5-Pin JPT Coupling



Fig. 237: Identifying 4-Pin JPT Plug

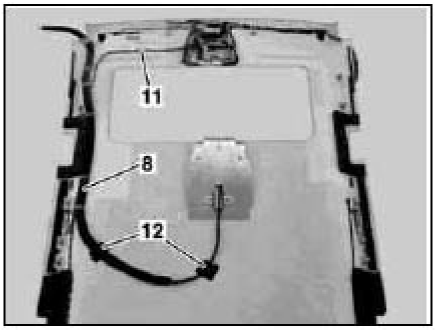


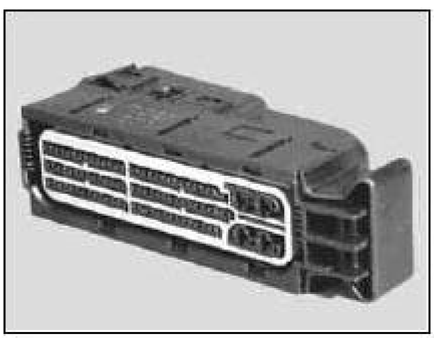
Fig. 238: Identifying 8/4-Pin, MQS/JPT Plug

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**
AR	Remove contacts from E95 coupling		**AR00.19-P-0120-05A**
AR	Remove contacts from standard power timer coupling		**AR00.19-P-0120-10A**
AR	Remove contacts from FIN sensor contact coupling		**AR00.19-P-0120-12A**

AR	Remove contacts from maxi power timer coupling		**AR00.19-P-0120-14A**
AR	Remove contacts from Micro Quadlock System coupling	Micro Quadlock System, coupling variant 2	**AR00.19-P-0120-04B**
AR	Remove contacts from Micro Quadlock System plug	Micro Quadlock System, plug variant 1	**AR00.19-P-0120-03A**

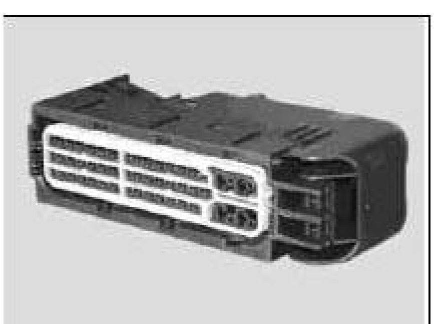
MULTI-CONTACT-POINT CONNECTOR FAMILY - GF00.19-P-8107A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



P54.18-2320-01

Fig. 239: Identifying 47-Pin MQS, MCP Coupling



P54.18-2321-01

Fig. 240: Identifying 47-Pin MQS, MCP Coupling

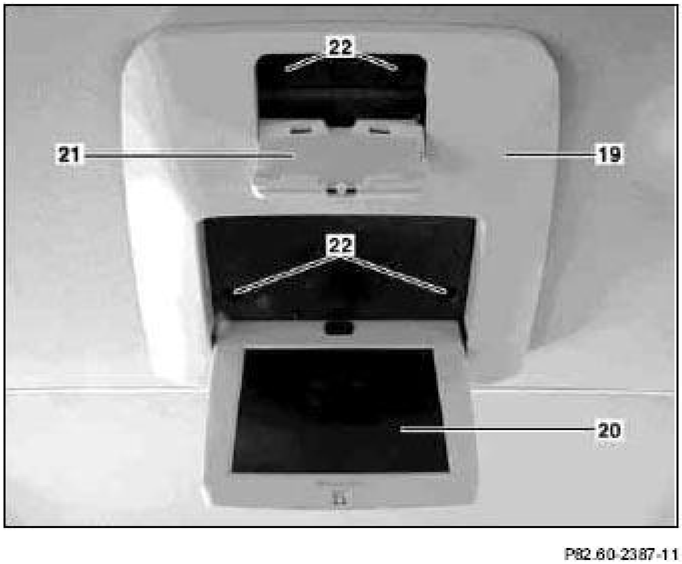


Fig. 241: Identifying 47-Pin MQS, MCP Coupling

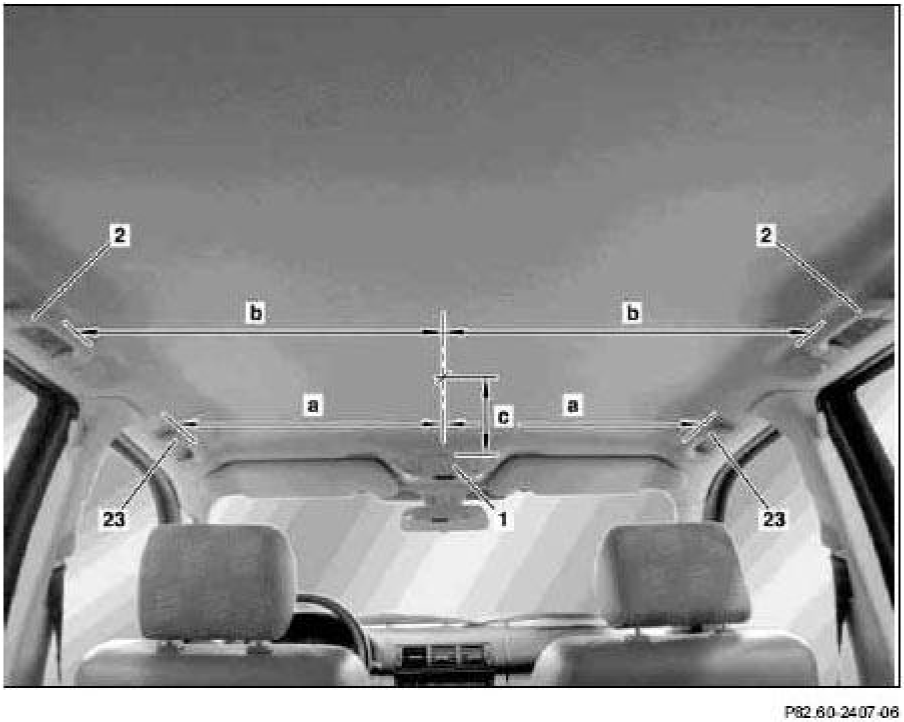


Fig. 242: Identifying 2-Pin MCP Coupling

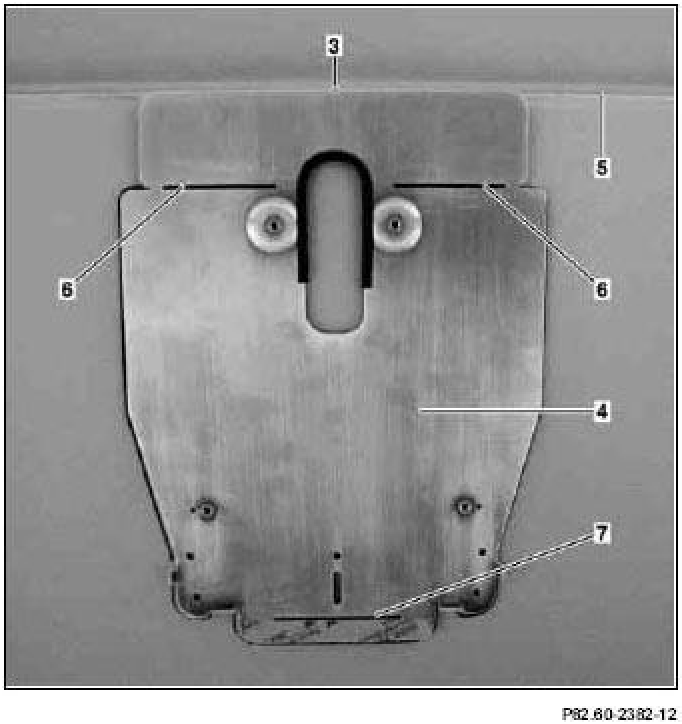


Fig. 243: Identifying 4-Pin MCP Coupling

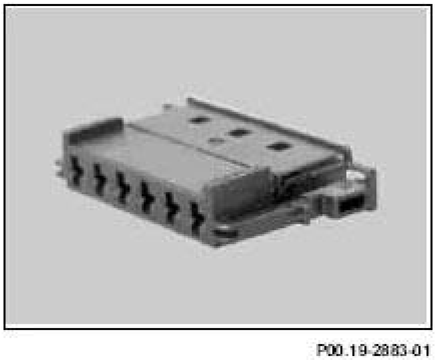


Fig. 244: Identifying 6-Pin MCP Coupling

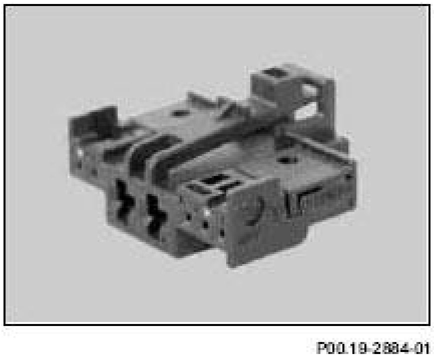


Fig. 245: Identifying 5/2-Pin MQS, MCP Coupling

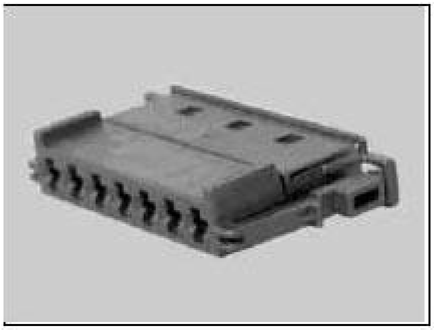

P00.19-2887-01

Fig. 246: Identifying 7-Pin MCP Coupling

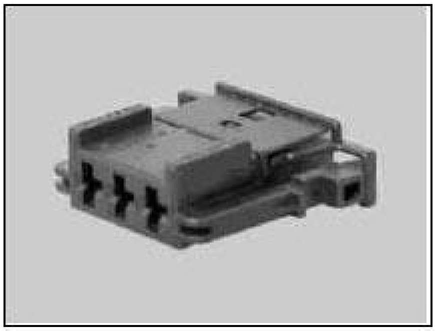
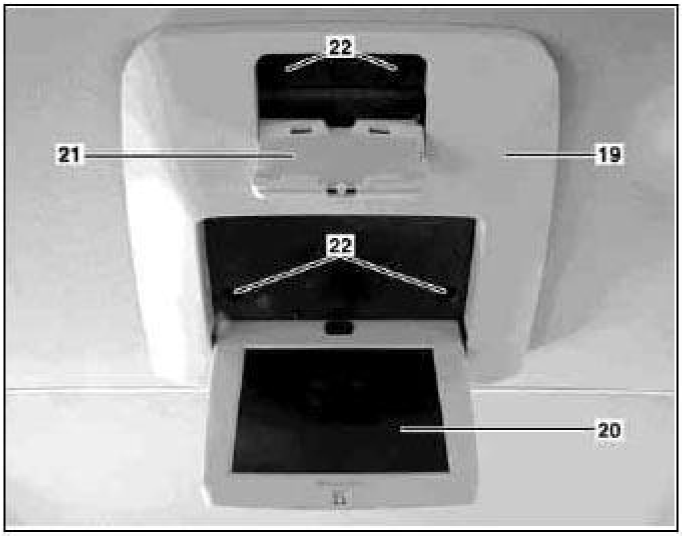
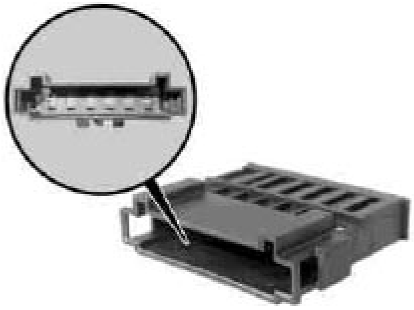

P00.19-2885-01

Fig. 247: Identifying 3-Pin MCP Coupling



P82.60-2387-11

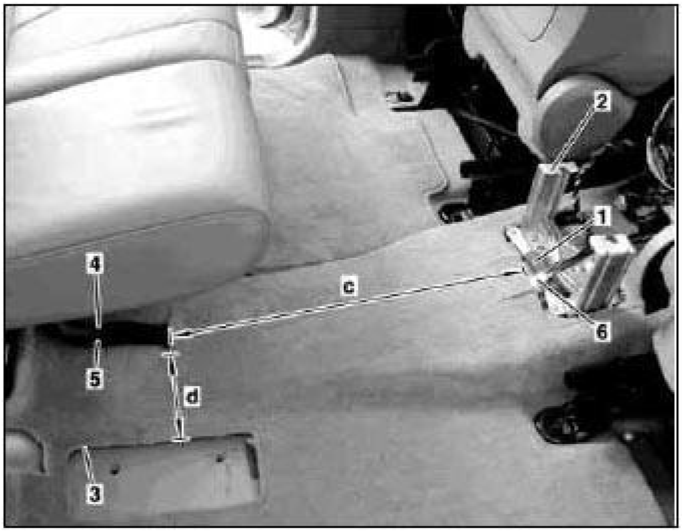
Fig. 248: Identifying 1-Pin MCP Coupling



P00.19-2993-01

Fig. 249: Identifying 6-Pin MCP Plug

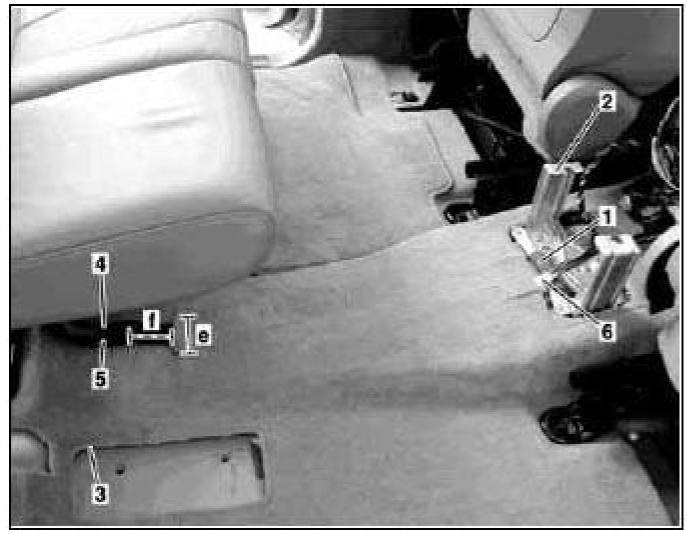
c	*510 mm*
d	*120 mm*



P82.60-2389-11

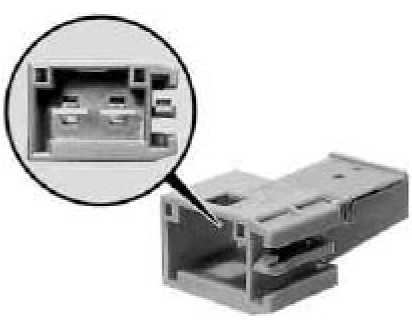
Fig. 250: Identifying 3/2-Pin MQS/MCP Coupling

e 70 mm
f 30 mm



P82.60-2390-11

Fig. 251: Identifying 4/2-Pin MQS/MCP Coupling



P54.18-4061-01

Fig. 252: Identifying 2-Pin MCP Coupling

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from Multi Contact Point (MCP) coupling		**AR00.19-P-0120-09A**
AR	Remove contacts from Micro Quadlock System coupling	Micro Quadlock System coupling, variant 1	**AR00.19-P-0120-04A**

Micro Quadlock System, coupling variant 2 | **AR00.19-P-0120-04B**

STANDARD POWER TIMER CONNECTOR FAMILY - GF00.19-P-8108A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



Fig. 253: Identifying 4-Pin SPT Coupling

1 Cutout in floor lining, 40% rear seat
2 Wiring harness video player
3 DVD player wiring harness

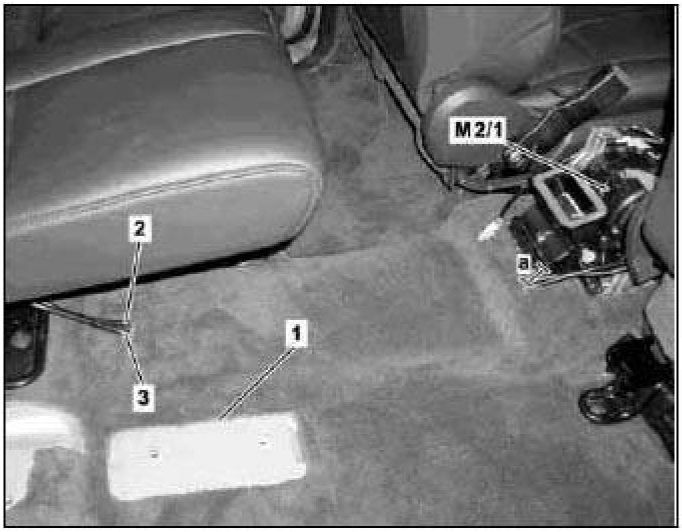
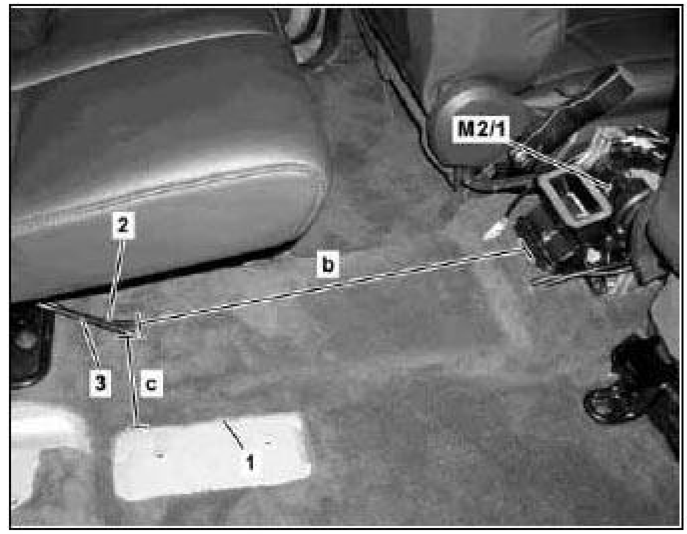


Fig. 254: Identifying 5-Pin SPT Coupling

1 Cutout in floor lining, 40% rear seat
2 Wiring harness video player
3 DVD player wiring harness



P82.60-2446-11

Fig. 255: Identifying 6-Pin SPT, JPT Coupling



P54.18-4048-01

Fig. 256: Identifying 10-Pin SPT Plug

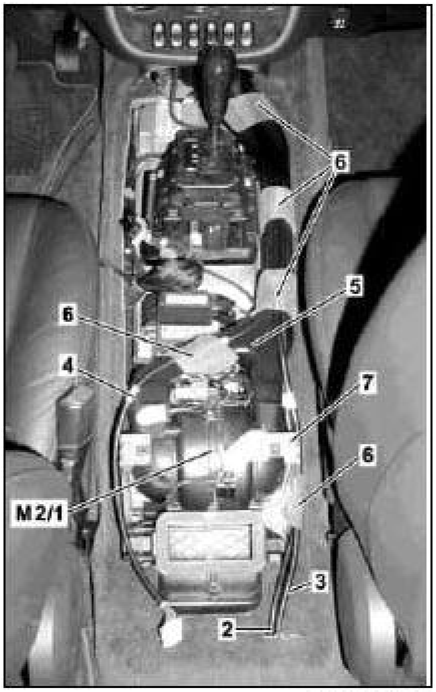


Fig. 257: Identifying 6-Pin SPT Coupling



Fig. 258: Identifying 7-Pin SPT Coupling

ⓘ	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230,	**AH00.19-P-1000-08A**

		240, 245, 251, 414, 461 as of 1.4.94, 463	
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from standard power timer coupling		**AR00.19-P-0120-10A**
AR	Remove contacts from standard power timer plug		AR00.19-P-0120-11A
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**

LAMELLA SENSOR CONTACT CONNECTOR FAMILY - GF00.19-P-8109A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



Fig. 259: Identifying 2/2-Pin LSK, JPT Coupling

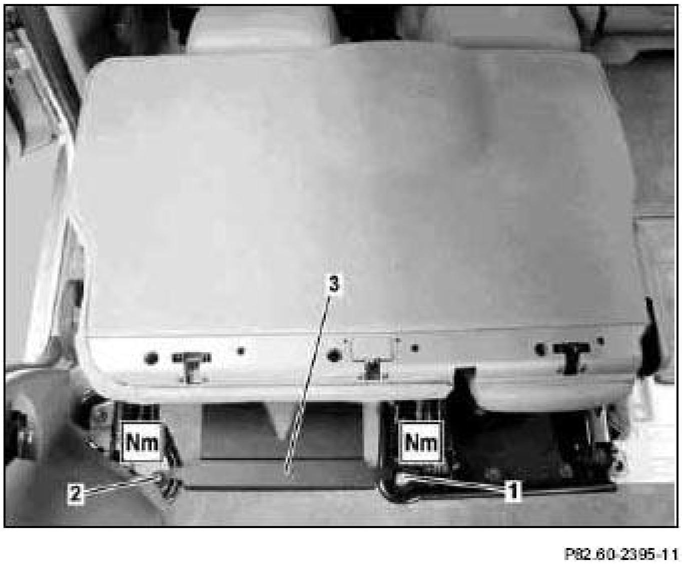


Fig. 260: Identifying 2-Pin LSK, Coupling



Fig. 261: Identifying 2-Pin LSK, Plug



Fig. 262: Identifying 4/2-Pin LSK, JPT Coupling

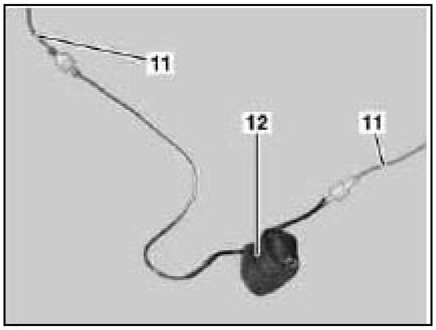


Fig. 263: Identifying 2/8-Pin LSK, SLK Coupling

ⓘ	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from FIN sensor contact plug		**AR00.19-P-0120-13A**
AR	Remove contacts from FIN sensor contact coupling		**AR00.19-P-0120-12A**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**
AR	Remove contacts from sensor laminated contact coupling	Spade-type sensor contact coupling, Design 97	**AR00.19-P-0120-02A**

MAXI POWER TIMER CONNECTOR FAMILY - GF00.19-P-8110A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

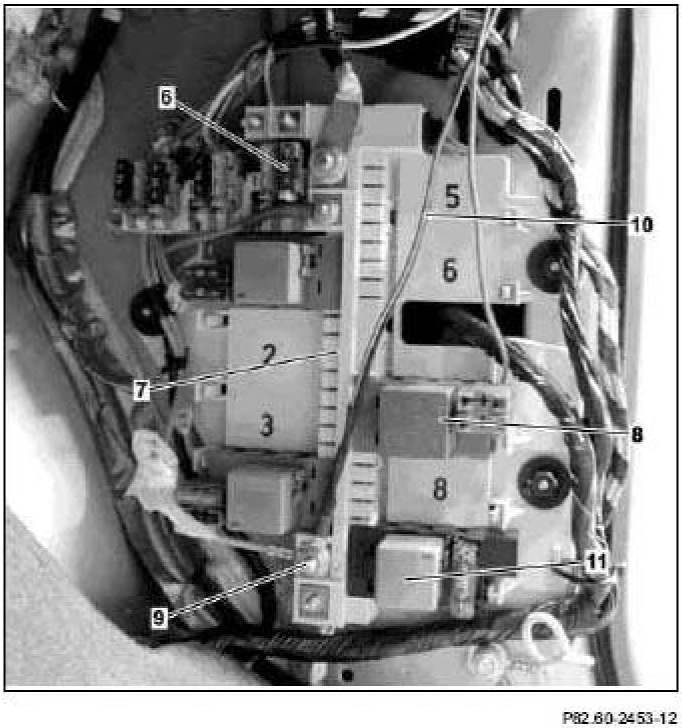


Fig. 264: Identifying 3/1-Pin MPT, JPT Coupling

ⓘ	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from maxi power timer coupling		**AR00.19-P-0120-14A**
AR	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**

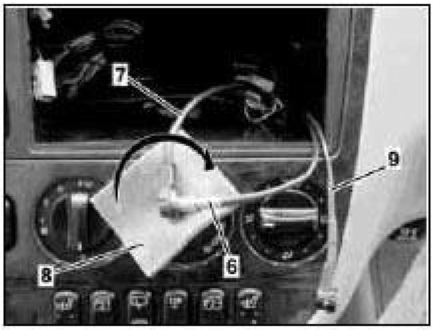
ROUND PLUG CONTACT 2.5 VARIANT 1 CONNECTOR FAMILY - GF00.19-P-8111A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



P54.18-2425-01

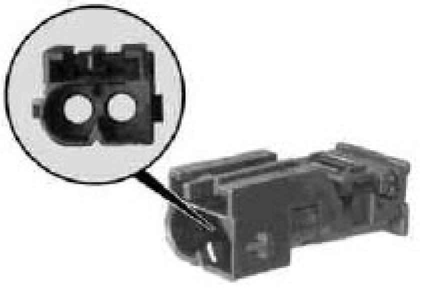
Fig. 265: Identifying 1-Pin RK-2.5 Coupling



P82.60-2399-01

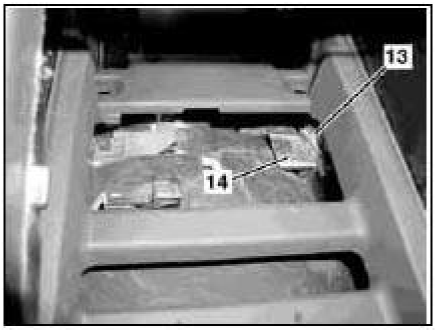
6	*Antenna cable for FM modulator*
7	*Vehicle antenna cable*
8	*Self-adhesive foamed material*
9	*Antenna cable for FM modulator*

Fig. 266: Identifying 1-Pin RK-2.5 Coupling



P54.18-2427-01

Fig. 267: Identifying 2-Pin RK-2.5 Plug



Illustrated as of VIN A289565, X754620

13 Auxiliary interface module connector

14 Mount for center console

Fig. 268: Identifying 2-Pin RK-2.5 Coupling

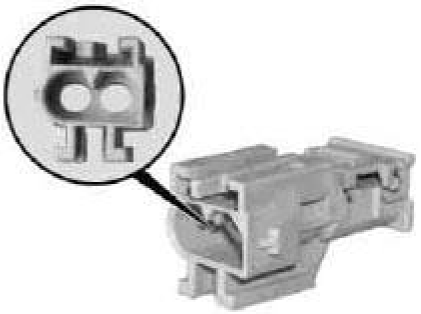
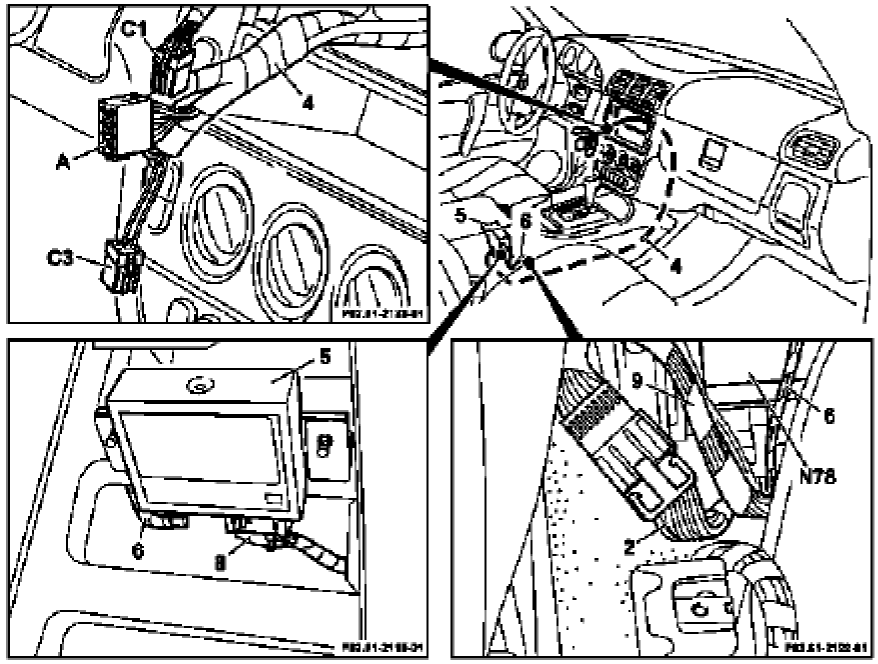


Fig. 269: Identifying 2-Pin RK-2.5 Plug



Fig. 270: Identifying 2-Pin RK-2.5 Coupling

2	*Standard wiring harness for N78 transfer case control module*
4	*TrafficStar wiring harness*
5	*CAN bus adapter*
6	*CAN bus lead*
8	*CAN bus adapter connector*
9	*CAN bus wiring harness*
A	*Radio connector*
C1	*Yellow sound connector*
C3	*Blue GPS antenna connector*
N78	*Transfer case control module*



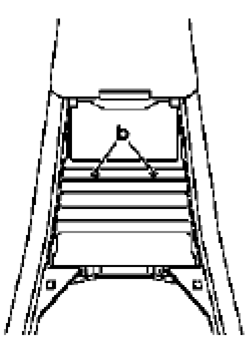
P82.61-2120-06

Fig. 271: Identifying 3-Pin RK-2.5 Plug



P54.18-2432-01

Fig. 272: Identifying 3-Pin RK-2.5 Coupling



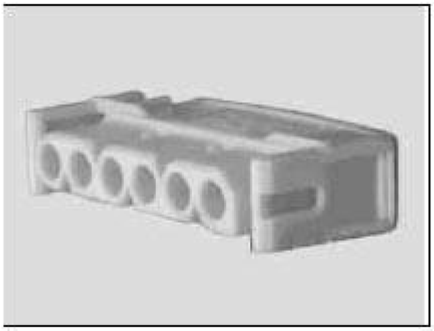
P82.61-2124-01

Fig. 273: Identifying 4-Pin RK-2.5 Plug



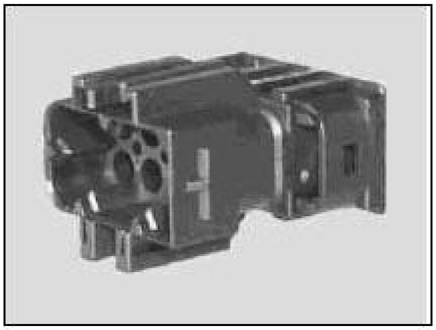
P54.18-2434-01

Fig. 274: Identifying 4-Pin RK-2.5 Coupling



P54.18-2435-01

Fig. 275: Identifying 6-Pin RK-2.5 Coupling



P54.18-2436-01

Fig. 276: Identifying 8-Pin RK-2.5 Plug



Fig. 277: Identifying 8-Pin RK-2.5 Coupling

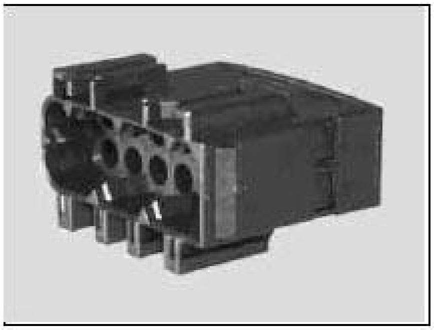


Fig. 278: Identifying 12-Pin RK-2.5 Plug



Fig. 279: Identifying 12-Pin RK-2.5 Coupling

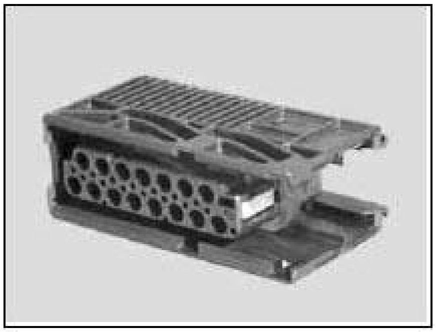


Fig. 280: Identifying 15-Pin RK-2.5 Coupling

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from 2.5 plug round plug contact	Round plug contact 2.5 variant 1	**AR00.19-P-0120-16A**
AR	Remove contacts from 2.5 round plug contact coupling	Round plug contact 2.5 variant 1	**AR00.19-P-0120-15A**

ROUND-TYPE CONTACT 2.5 SOLDER CONTACT CONNECTOR FAMILY - GF00.19-P-8112A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



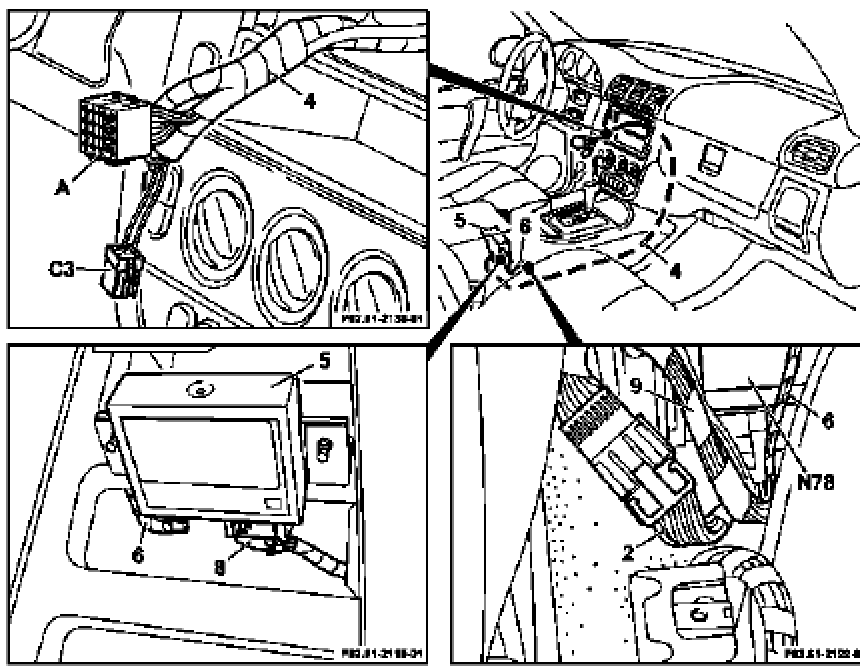
Fig. 281: Identifying 2-Pin RK-2.5 Solder Contact Plug



P54.18-2311-01

Fig. 282: Identifying 2-Pin RK-2.5 Solder Contact Coupling

2	Standard wiring harness for N78 transfer case control module
4	TrafficStar wiring harness
5	CAN bus adapter
6	CAN bus lead
8	CAN bus adapter connector
9	CAN bus wiring harness
A	Radio connector
C3	Blue GPS antenna connector
N78	Transfer case control module



P82.61-2136-06

Fig. 283: Identifying 4-Pin RK-2.5 Solder Contact Plug



P54.18-2546-01

Fig. 284: Identifying 4-Pin RK-2.5 Solder Contact Coupling

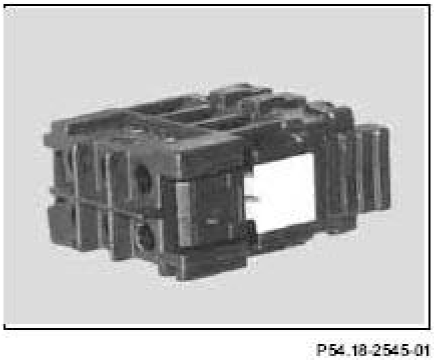


Fig. 285: Identifying 6-Pin RK-2.5 Solder Contact Coupling

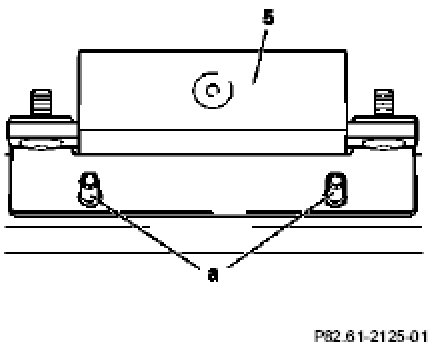


Fig. 286: Identifying 8-Pin RK-2.5 Solder Contact Plug



Fig. 287: Identifying 8-Pin RK-2.5 Solder Contact Coupling

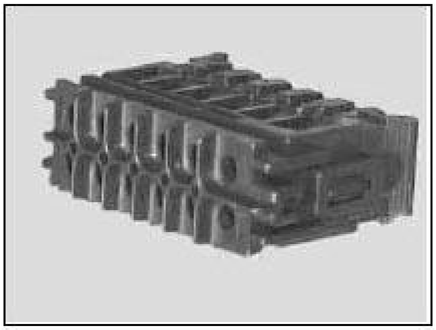


Fig. 288: Identifying 12-Pin RK-2.5 Solder Contact Coupling

ⓘ	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from 2.5 solder contact plug round plug contact		**AR00.19-P-0120-18A**
AR	Remove contacts from 2.5 solder contact coupling round plug contact		**AR00.19-P-0120-17A**

LAMELLA CONTACT SYSTEM 1.5 CONNECTOR FAMILY - GF00.19-P-8113A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

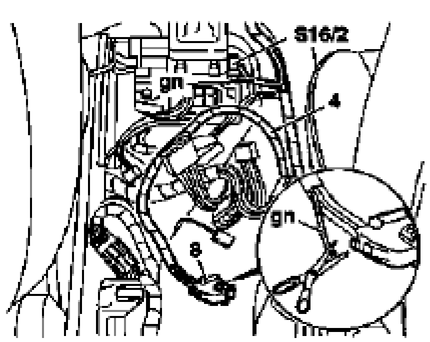


Fig. 289: Identifying 4-Pin LKS-1.5 Plug



Fig. 290: Identifying 4-Pin LKS-1.5 Coupling

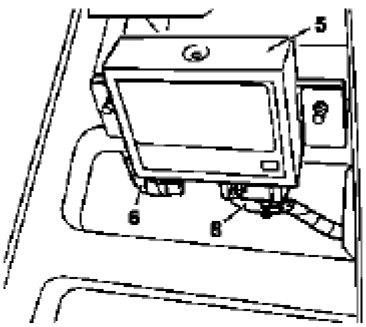


Fig. 291: Identifying 12+2-Pin LKS-1.5 Plug

	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from laminated contact system plug		**AR00.19-P-0120-20A**
AR	Remove contacts from laminated contact system coupling		**AR00.19-P-0120-19A**

MINI LAMELLA CONTACT CONNECTOR FAMILY - GF00.19-P-8115A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



Fig. 292: Identifying 4-Pin MLK Coupling

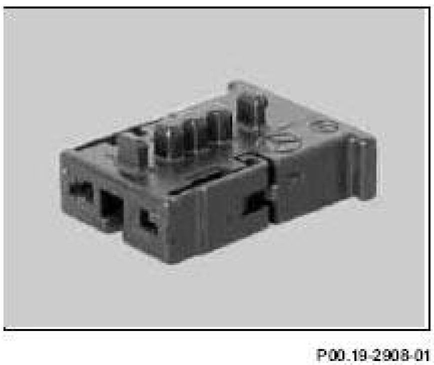


Fig. 293: Identifying 2-Pin MLK Coupling

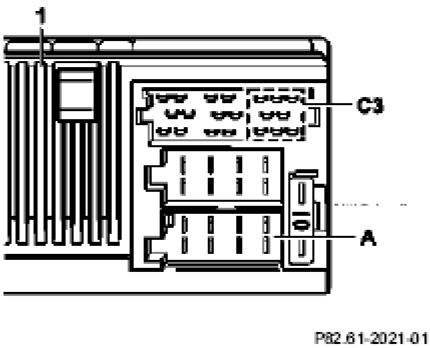


Fig. 294: Identifying 2-Pin MLK Coupling

1	TrafficStar display field
A	Automatic button
GHI	Multifunction button
M	Mode button
MNO	Multifunction button
←	Multifunction button
*	Multifunction button

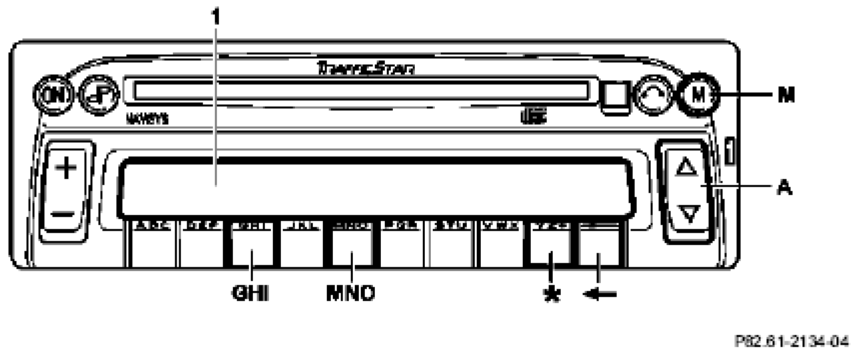


Fig. 295: Identifying 2-Pin MLK Plug



Fig. 296: Identifying 2-Pin MLK Coupling



Fig. 297: Identifying 7-Pin MLK Coupling



Fig. 298: Identifying 2-Pin MLK Coupling



Fig. 299: Identifying 4-Pin MLK Coupling



Fig. 300: Identifying 5-Pin MLK Coupling



Fig. 301: Identifying 8-Pin MLK Coupling

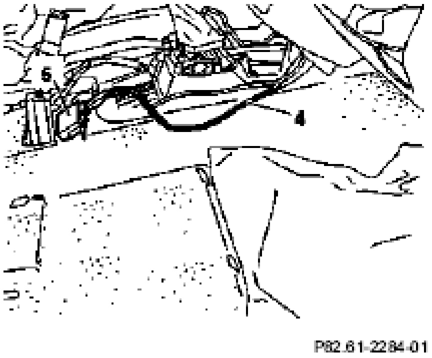


Fig. 302: Identifying 8-Pin MLK Plug



Fig. 303: Identifying 3-Pin MLK Coupling



P00.19-2990-01

Fig. 304: Identifying 6-Pin MLK Coupling



P00.19-3506-01

Fig. 305: Identifying 2-Pin MLK Coupling



P00.19-3508-01

Fig. 306: Identifying 3-Pin MLK Coupling



Fig. 307: Identifying 2-Pin MLK Coupling



Fig. 308: Identifying 4-Pin MLK Coupling

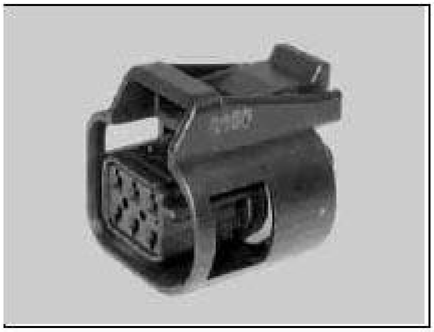


Fig. 309: Identifying 5-Pin MLK Coupling



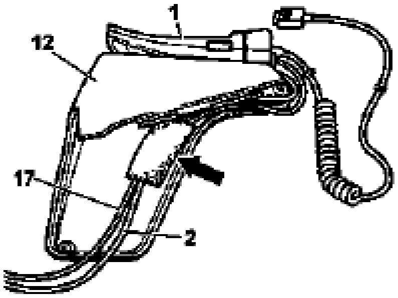
P00.19-3502-01

Fig. 310: Identifying 6-Pin MLK Coupling



P00.19-3510-01

Fig. 311: Identifying 6-Pin MLK Coupling



P82.70-2008-01

Fig. 312: Identifying 2-Pin MLK Plug

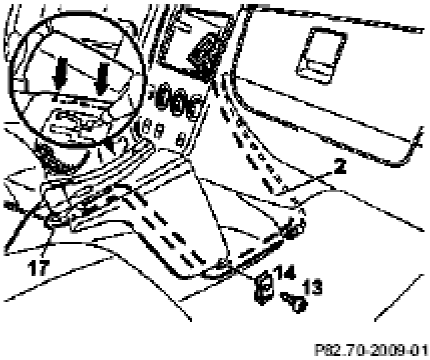


Fig. 313: Identifying 3-Pin MLK Plug

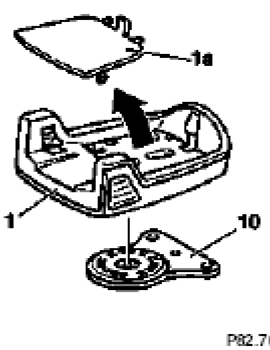


Fig. 314: Identifying 4-Pin MLK Plug



Fig. 315: Identifying 8-Pin MLK Coupling

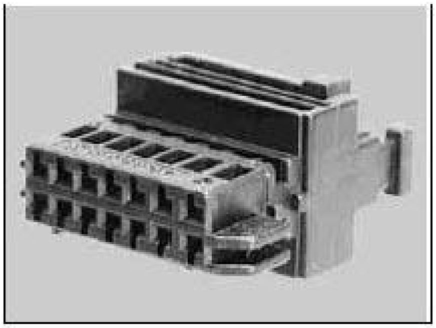


Fig. 316: Identifying 14-Pin MLK Plug

(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
AR	Remove contacts from mini laminated contact coupling		**AR00.19-P-0120-26A**
AR	Remove contacts from mini laminated contact plug		**AR00.19-P-0120-27A**

ACTIVE SERVICE SYSTEM (ASSYST) OPERATING NOTES - GF00.20-P-0003-01A

Displaying remaining distance, remaining time or service exceeded when vehicle stationary or when driving on driver request:

- Wake-up instrument cluster.
- Start switch in position "2" or driving.
- Operate reset button for trip counter twice within 1 s: the current remaining distance, the current remaining time or the current service exceeded appears.

Displaying oil level at driver request:

- After start switch in position "2", wait 10 s until "DISPLAY OIL LEVEL" text and oil can symbol (or oil can and clock symbol) appears.
- Press reset button for trip counter twice within 1 s: the message "OIL LEVEL OKAY" (or "O.K.") or the current missing oil quantity appears. If correct oil level measurement is not possible, the text "OBSERVE WAITING TIME" appears (or the clock symbol and the oil can symbol; the clock symbol flashes).

(The texts in parentheses relate to vehicles without multifunction display.)

Resetting ASSYST after oil change (oil change reset) at instrument cluster:

- Move start switch into position "2".
- Within the first 4 s after moving start switch into position "2": press reset button for trip counter twice within one second. The display for the service request is thus activated for 10 s.
- **Within these 10 s** move start switch into position "0". The service request continues to be displayed.
- Press reset button for trip counter and **hold pressed** .
- Move start switch into position "2".
- **Continue to hold** reset button for trip counter **pressed** (about 10 s) until the signal sounds and the new start distance appears in the display.

BLOCK DIAGRAM OF ACTIVE SERVICE SYSTEM (ASSYST) - GF00.20-P-0003-03A

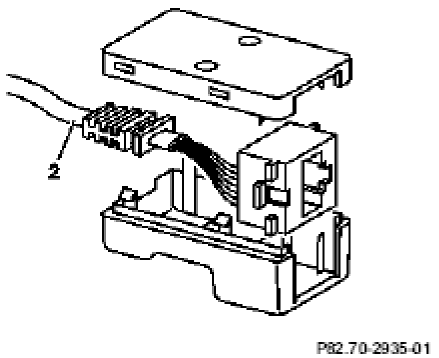


Fig. 317: Block Diagram Of Active Service System (ASSYST)

ACTIVE SERVICE SYSTEM (ASSYST) DISPLAY FACILITIES - GF00.20-P-0003-04A

The table shows a number of possible types of displays of the active service system for different vehicles and different instrument clusters.

(The display appears in the language set with the HHT under national code.)

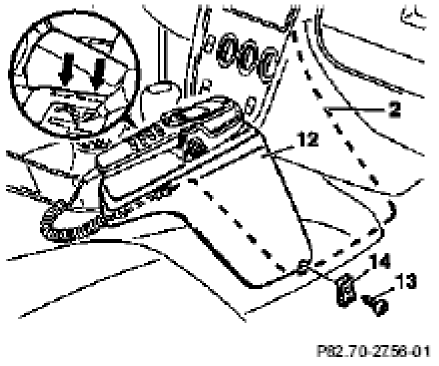


Fig. 318: Identifying Active Service System (ASSYST) Display

ACTIVE SERVICE SYSTEM (ASSYST) INFLUENCING PARAMETERS - GF00.20-P-0003-05A

The values of various influencing parameters are required by ASSYST for calculating the demand-based service interval, and these are included in the calculation of the service interval as **weighting factors** . There are **two versions** within ASSYST, the difference being in the oil level sensors fitted:

- The familiar oil **level indicator switch (S43)** is fitted to engines (104, 111, 119, 120, 602.982, 604, 605, 606). In view of the fact that this is a switch, it is only possible to detect if the oil level drops below the minimum level.
- The **oil sensor (oil level/temperature/quality, B40)** is used on more recent engines (e.g. 112, 113, 166, 611, 668). This sensor consists of 2 capacitor systems with the engine oil as an insulator. If the water content of the oil or the oil level changes, there is a change in the capacitance of the "capacitor".

  The capacitance is thus a measure for the oil level.

  In addition, the oil sensor (oil level/temperature/quality, B40) contains a **temperature sensor** which detects the temperature of the engine oil.

  All the signals are processed in the electronics integrated in the sensor to form a PWM (pulse width modulated) signal, and passed to the engine control module (N3).

In addition to the weighting factors, which depend on reallife driving conditions, **quality factors** are also used for calculating the demand-based service interval (remaining distance and remaining time).

Survey of ASSYST influencing parameters

- **Weighting factors** (dependant on reallife driving conditions):
  - Load torque
  - Engine speed
  - Oil level
  - Engine oil temperature
  - Oil correction factor (is used as comparative value for determining oil level)
  - Coolant temperature

  These data are supplied by the injection system control module (N3) to the service microprocessor over the CAN.

  The data relating to oil level, engine oil temperature and oil correction factor are supplied by the oil sensor (oil level/temperature/quality, B40) through the injection system control module (N3), and are therefore only available on engines fitted with this sensor.

- **Quality factors** (these are factory-set to base values and can be changed with the HHT, if operating conditions of the vehicle so necessitate; they influence the start distance):

- Engine version factor (gasoline/diesel)
- National factor (The kilometer or mileage is coded in accordance with the national version.)

- **Distance travelled** :

  ASSYST is supplied with the 4 wheel speeds from the traction systems control module (N47) over the CAN for calculating the distance travelled.

- **Time**

  ASSYST is supplied with the time information from the clock integrated in the instrument cluster.

ACTIVE SERVICE SYSTEM (ASSYST) SURVEY MODEL/ENGINE/SENSOR/INSTRUMENT CLUSTER - GF00.20-P-0003-06A

The table below (status: March 1999) lists the various vehicle models with the different engines and the different oil level sensors.

In addition, the table also indicates whether an instrument cluster with multifunction display is fitted.

Model	Engine	Oil level sensor	Multifunction display with engine
129	112, 113 103, 104, 119, 120	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
140	- 104, 119, 120, 606	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
163	112, 113, 612 111	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
168	166, 668 -	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
170	112 111	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
202	112, 113, 611 104, 111, 601, 604, 605	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	-
208	112, 113 111	Oil sensor (oil level/temperature/quality, B40) Oil level indicator switch S43	Engine 112 only (J) and Gulf States: engine 111
210	112, 113, 611 104, 111, 602, 605, 606	Oil sensor (oil level/temperature/quality, B40)	Engines 112,113 Gulf States, (USA) , (J) : on all engines fitted; others:

			engines 602, 606 for (I) in addition engine 605 LA

ACTIVE SERVICE SYSTEM (ASSYST) FUNCTION - GF00.20-P-0003A

MODEL 129 with ENGINE 112, 113

MODEL 163 with ENGINE 112, 113, 612

MODEL 168 with ENGINE 166, 668

MODEL 202 with ENGINE 112, 113, 611

MODEL 208 with ENGINE 112, 113

MODEL 210 with ENGINE 112, 113, 611, 612, 613

General

The **"Active service system (ASSYST)" draws the attention of the driver to a service which is due.**

ASSYST is a demand-activated engine oil service system. In other words, in addition to the pure time and distance criterion, various factors are taken into account for calculating the demand-oriented service intervals. These are on the one hand quality factors which are coded with the HHT, and on the other hand weighting factors which take into account driving conditions and thus actual wear and tear.

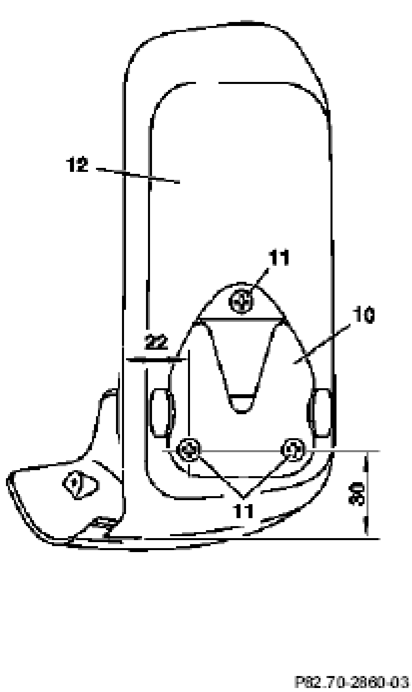


Fig. 319: Identifying Text Panel And Tool Symbol

After a level has dropped below a warning threshold, the remaining distance or the remaining time is displayed in text panel (b) and the tool symbol (a) appears in the display (top ill.). In addition, ASSYST features a low engine oil level display. If the oil level is too low or too high, this appears in text panel (b) and the oil can symbol (a) is displayed (bottom ill.).

(i The illustrations relate to models with multifunction display. For other models, refer to document: "ASSYST display facilities".)

Service A/B display

All models will feature an automatic display of the service (A or B) by no later than modification year 00/1. More detailed information is contained in the document displaying service.

17	Antenna wire
H4/12	Hands-free speaker

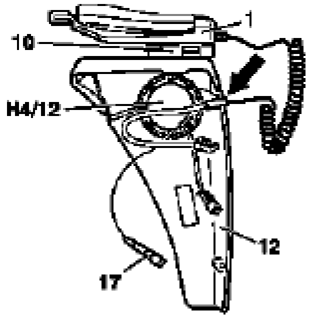


Fig. 320: Identifying Service A/B Display

In view of the complexity of the system, ASSYST features its own processor in the instrument cluster.

ASSYST is supplied with the time information from the electronic clock integrated in the instrument cluster.

The other data required are supplied over the CAN dataline by the traction systems control module (N47) and by the injection system control module (N3).

CAN data required for ASSYST:

- wheel speed signals for calculating the vehicle speed and distance (from traction systems control module, N47)
- Coolant temperature (from injection system control module, N3)
- Engine oil temperature (from injection system control module, N3)
- Oil level (from injection system control module, N3)
- Engine speed (from injection system control module, N3)
- Load torque (from injection system control module, N3)
- Oil correction factor (from injection system control module, N3)

	Active service system (ASSYST)		**GF00.20-P-0003-03A**

	block diagram		
	Active service system (ASSYST) display facilities		**GF00.20-P-0003-04A**
	Active service system (ASSYST) influencing variables		**GF00.20-P-0003-05A**
	Active service system (ASSYST) survey of model/engine/sensor/instrument cluster		**GF00.20-P-0003-06A**
	Remaining distance function		**GF00.20-P-2007A**
	Remaining time function		**GF00.20-P-2008A**
	Engine oil monitor function		**GF00.20-P-2009A**
	Displaying service function	Model 129, 202 as of 8.99 Model 163 as of 1.00 Model 168 as of 9.99 Model 170 as of 12.99	**GF00.20-P-2010B**

ACTIVE SERVICE SYSTEM (ASSYST) FUNCTION DESCRIPTION CONTENTS - GF00.20-P-0997AZ

MODEL 129 as of 1.6.97

MODEL 140 as of 1.6.97

MODEL 163

MODEL 168

MODEL 170 as of 1.6.97

MODEL 202 as of 1.6.97

MODEL 208 up to 31.7.99

MODEL 210.081 /281 /025 /063 /065/225 /265 /663 up to 31.5.97

MODEL 210 as of 1.6.97 up to 30.6.99

	Active service system (ASSYST) function	Engines with oil sensor (e.g. 112, 113, 611) Model 210 as of 01.03.97 with engine 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except	**GF00.20-P-0003A** GF00.20-P-0003B

		engine 112, 113, 611, 612 (Valid for engines with oil level switch.)	
	Active service system (ASSYST) operating information	Engines with oil sensor (e.g. 112, 113, 611)	**GF00.20-P-0003-01A**
		Model 210 as of 01.03.97 with engine 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except engine 112, 113, 611, 612 (Valid for engines with oil level switch.)	GF00.20-P-0003-01B
	Active service system (ASSYST) block diagram		**GF00.20-P-0003-03A**
	Active service system (ASSYST) display facilities		**GF00.20-P-0003-04A**
	Active service system (ASSYST) influencing variables		**GF00.20-P-0003-05A**
	Active service system (ASSYST) survey of model/engine/sensor/instrument cluster		**GF00.20-P-0003-06A**
	Remaining distance function		**GF00.20-P-2007A**
	Remaining time function		**GF00.20-P-2008A**
	Displaying service function	Model 129, 202 as of 8.99 Model 163 as of 1.00 Model 168 as of 9.99 Model 170 as of 12.99	**GF00.20-P-2010B**
	Engine oil monitor function	Engines with oil sensor (e.g. 112, 113, 611)	**GF00.20-P-2009A**
		Model 210 as of 01.03.97 with engine 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except engine 112, 113, 611, 612 (Valid for engines with oil level switch.)	GF00.20-P-2009B
	Instrument cluster (IC) function description contents		**GF54.30-P-0997AZ**

REMAINING DISTANCE FUNCTION - GF00.20-P-2007A

MODEL 129 as of 1.6.97

MODEL 140 as of 1.6.97

MODEL 163

MODEL 168

MODEL 170 as of 1.6.97

MODEL 202 as of 1.6.97

MODEL 208 up to 31.7.99

MODEL 210 as of 1.3.97 up to 30.6.99

The service intervals which are possible with ASSYST range

- on engines with oil sensor (e.g. 112, 113, 166, 611) between 15 000 and 30 000 km,
- for the new direct injection diesel engine 668 between 20 000 and 40 000 km,
- for engines with oil level switch between 15 000 and 22 500 km (for engine 602.982 between 20 000 and 30 000 km).

The service interval achieved depends on the start distance and the driving conditions (cf. remaining distance).

Start distance and remaining distance

Start distance refers to the service interval in km/miles which is the **minimum distance** which may be driven until the next service. On engines with oil sensor (e.g. 112, 113, 166, 611, 668) this applies only, however, if the specified quantity of oil has been added during the oil change.

The start distance is dependent on:

- the set **quality factors**

  (The quality factors are factory-set to a basic setting. They can be altered with the HHT, if operating conditions so necessitate.)

The start distance is not dependent on the driving conditions (weighting of the distance driven) and on any oil replenishments .

The standard value is normally 15 000 km, for the new direct injection diesel engine 668 20 000 km.

The figure may differ from this, however, depending on quality factors.

The start distance is automatically reset to its initial value by the oil change reset each time the oil is changed. The start distance is an **internal** computed quantity and **cannot** be displayed in the instrument cluster. It is possible to display the start distance with the HHT.

What is normally displayed in the instrument cluster is the **remaining distance** .

The remaining distance is the same as the start distance immediately after the oil change. On engines with oil sensor (e.g. 112, 113, 166, 611, 668) this applies only, however, if the specified quantity of oil has been added during the oil change.

The remaining distance is the distance which remains from the current kilometer reading until the next service. The possible length of the interval is at least as great as the remaining distance displayed immediately after an oil change, and is at the most twice the start distance.

The remaining distance is dependent on

- the **start distance**
- the **driving conditions** (a **weighting** of the distance driven takes place)
- any oil **replenishments** in the case of engines with oil sensor (e.g. 112, 113, 166, 611, 668)

Consequently, ASSYST also takes into account the driving conditions: In the case of a **favorable weighting** (e.g. small number of cold starts, no high engine revs, small number of short-distance trips, minimum extent of towing a trailer etc.) and oil replenishments, the driver is provided with a bonus which extends the remaining distance and thus the service interval. Account is also taken of whether the vehicle is actually driven or whether the engine runs at idle speed. ASSYST is constantly supplied with the data regarding the current operating conditions of the vehicle for this purpose.

In the case of the **best weighting** , only **0.6 km** are added for each kilometer driven.

In the case of the **most unfavorable weighting of the distance** (e.g. frequent short-distance trips, large number of cold starts), the remaining distance and thus the service interval is smaller than in the case of the most favorable weighting (assuming identical quality factors).

In the case of the **most unfavorable** weighting, up to **3 km** are added for each kilometer driven.

The start distance and the remaining distance are once again presented in the form of a graph in the diagram opposite, taking the **example of gasoline engines**

Each time the oil is changed, the start and remaining distances are set to the initial value. In this case, the normal value of 15 000 km is entered as the start distance (top bar) (shaded + dark section). The start distance may differ from 15 000 km (e.g. 14 000 km; shaded section) if the quality factors do not correspond to the basic setting. In the case of engines fitted with oil sensor (e.g. 112, 113, 166) the start distance may also be less than 15 000 km if the specified oil quantity was not added during the oil change. **The remaining distance (bottom bar) is always 15 000 km, however, immediately after an oil change. In addition, the service interval is always at least 15 000 km .**

The total remaining distance and thus the service interval may be increased to not more than twice the start distance, 30 000 km in this case (white section) as a result of corresponding **bonuses** (favorable weighting of distances driven) and in the case of engines fitted with oil sensor (e.g. 112, 113, 166).

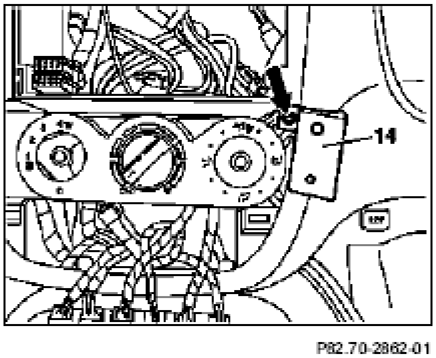


Fig. 321: Start And Remaining Distance Graph

However, a start distance of less than 15 000 km results in a reduction in the **maximum** attainable service interval.

Refer also to the diagrams in the document "Engine oil monitoring".

Warning threshold (km)

With the HHT it is possible to set a warning threshold between 250 km and 8000 km for the remaining distance.

This warning threshold is set differently for 3 different distances driven. The system adjusts to the correct annual distance driven by calculating the daily distance driven (refer to table):

Display of remaining distance (The readout is shown in kilometers or miles depending on the national code.):

- at driver request
- automatically, after 5 s start switch in position 2 or driving if the **warning threshold is reached** :

  The warning symbol and the readout: "SERVICE IN .... KM" appears for 10 s. (On models not fitted with multifunction display, the service symbol appears together with the remaining distance in kilometers, from mid July 97 "... km".)

- automatically, after 5 s start switch in position 2 or driving if the **remaining distance is exceeded** :

  In this case, the readout "KM .... EXCEEDED" appears together with the service symbol for 30 s (up to mid July 97 for 10 s). (On models not fitted with multifunction display, the service symbol appears together with the remaining distance with a negative sign in kilometers as a flashing display, as of mid July 97 "... km".)

  As of approx. 06.97 a brief warning signal sounds in addition.

The remaining distance is displayed with a resolution of 100 km.

[i] If a speed limit is set at the cruise control, the speed limit appears for a short moment in the display before the ASSYST text.

In the normal case, it is the remaining distance which is displayed. However, the time information is always processed in the background to enable the attention of "low-mileage drivers" to be drawn to any service due. The remaining distance is compared each day with the remaining time. In certain circumstances, the display switches over, and it is the remaining time which is displayed ([i] see document "Remaining time").

If certain measured values are not supplied to the ASSYST system, e.g. because of failure of a sensor, it switches over to stored substitute values. A corresponding entry is made in the fault memory of the relevant control module.

The data are retained if the operating voltage is disconnected or fails.

	Active service system (ASSYST) operating information	Engines with oil sensor (e.g. 112, 113, 611)	**GF00.20-P-0003-01A**
		Model 210 as of 01.03.97 with engines 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except engine 112, 113, 611 (Valid for engines with oil level switch.)	GF00.20-P-0003-01B
	Active service system (ASSYST) display facilities		**GF00.20-P-0003-04A**
	Remaining time function		**GF00.20-P-2008A**
	Engine oil monitor function	Engines with oil sensor (e.g. 112, 113, 611)	**GF00.20-P-2009A**
		Model 210 as of 01.03.97 with engines 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except engine 112, 113, 611 (Valid for engines with oil level switch.)	GF00.20-P-2009B
	Displaying service function	Model 129, 202 as of 8.99 Model 163 as of 1.00 Model 168 as of 9.99 Model 170 as of 12.99	**GF00.20-P-2010B**

REMAINING TIME FUNCTION - GF00.20-P-2008A

MODEL 129 as of 1.6.97

MODEL 140 as of 1.6.97

MODEL 163

MODEL 168

MODEL 170 as of 1.6.97

MODEL 202 as of 1.6.97

MODEL 208 up to 31.7.99

MODEL 210 as of 1.3.97 up to 30.6.99

Start time and remaining time

Start time refers to the service interval in days **immediately after the oil change**

The start time is not dependent on the driving conditions and any oil replenishments .

The start time is 730 days ( 365 days).

The start time is automatically reset to its initial value by the oil change reset after each oil change. The start time is an **internal** computed variable and **cannot** be displayed in the instrument cluster. It is possible to display the start time with the HHT.

The **remaining time** is displayed in the instrument cluster under certain conditions as stated below.

The remaining time is the time which remains until the next service.

The remaining time is only of importance for "low-mileage drivers". (It is therefore the remaining **distance** which is displayed as a general rule.)

The remaining time depends on:

- the **start time**
- the **driving conditions** (the distance driven is **weighted** in this case.)

Replenishing oil, however, **does not** have any influence on the remaining time.

As a result of these dependent factors, ASSYST proves to be a demand-oriented system even for "low-mileage drivers". Depending on the weighting of the factors, the service interval for "low-mileage drivers" is between 1 and 2 years.

Warning threshold (in days)

With the HHT it is possible to set a warning threshold of between 5 and 30 days for the remaining time, with a stepwidth of one day. The basic setting is 30 days.

Display of remaining time

The remaining time is always only displayed in those cases where the following condition is met:

Remaining time (in days) x 40 < remaining distance (in km), **and** the warning threshold is reached.

The remaining time is displayed in the following cases:

- automatically, after 5 s start switch in position 2 or driving, if the **warning threshold** is reached:

  The service symbol and the readout "SERVICE IN ... DAYS" appears for 10 seconds. (On vehicles not fitted with multifunction display, the current remaining time, the service and the clock symbol appear.)

- automatically, after 5 s start switch in position 2 or driving, if the **remaining time** is exceeded:

  The service symbol and the readout "DAYS ... EXCEEDED" appears for 30 s (for 10 s up to mid-July 97). (On vehicles not fitted with multifunction display, the service and the clock symbol appear. The "remaining time" is displayed with a negative sign (minus sign). The readout flashes in this case.)

  After the display reaches the maximum readout of -730 days, the readout remains at this figure! The readout is displayed with a resolution of 1 day.

  As of approx. 06.97 a brief warning signal sounds in addition.

- at driver request. The readout is then displayed, as above, for 10 s.

[i] If a speed limit is set at the cruise control, this speed limit is displayed for a short moment before the ASSYST display.

If certain measured values are not supplied to the ASSYST, e.g. because of failure of a sensor, it switches to stored substitute values. An appropriate entry is then made in the fault memory of the particular control module.

If the power supply fails, the data are retained. The times without operating voltage (battery disconnected) are not recorded, however! They can be retroactively included, however, with the HHT.

	Active service system (ASSYST) operating information	Engine with oil sensor (e.g. 112, 113, 611) Model 210 as of 01.03.97 with engines 111, 602, 604, 605, 606 Model 129, 140, 170, 202	**GF00.20-P-0003-01A** GF00.20-P-0003-01B

		as of 06.97 except engine 112, 113, 611 (Valid for engines with oil level switch.)	
	Active service system (ASSYST) display facilities		**GF00.20-P-0003-04A**
	Remaining distance function		**GF00.20-P-2007A**
	Engine oil monitor function	Engine with oil sensor (e.g. 112, 113, 611)	**GF00.20-P-2009A**
		Model 210 as of 01.03.97 with engines 111, 602, 604, 605, 606 Model 129, 140, 170, 202 as of 06.97 except engine 112, 113, 611 (Valid for engines with oil level switch.)	GF00.20-P-2009B
	Displaying service function	Model 129, 202 as of 8.99 Model 163 as of 1.00 Model 168 as of 9.99 Model 170 as of 12.99	**GF00.20-P-2010B**

ENGINE OIL MONITOR FUNCTION - GF00.20-P-2009A

MODEL 129 with ENGINE 112, 113

MODEL 163 with ENGINE 112, 113, 612

MODEL 168 with ENGINE 166, 668

MODEL 202 with ENGINE 112, 611

MODEL 208 up to 31.7.99 with ENGINE 112, 113

MODEL 210 up to 30.6.99 with ENGINE 112, 113, 611

General

The oil level is constantly monitored by the oil sensor, and the appropriate data transmitted to the processor by the ASSYST.

Oil replenishments are detected automatically and result in a bonus, which extends the service interval accordingly.

An excess oil level or insufficient oil level appears in the display together with the oil can symbol.

Display of low oil level at maximum:

- at driver request

Display of warnings:

- automatically, at the earliest 60s after engine start and oil temperature greater than 60°C:
  - if oil level too high: the oil can symbol appears together with the readout "OIL LEVEL ABOVE MAX". In addition, a brief warning signal sounds. (On models not fitted with multifunction display, "HI" appears flashing.)
  - if oil level too low: the oil can symbol appears together with the readout "OIL LEVEL BELOW MIN". In addition, a brief warning signal sounds. (On models not fitted with multifunction display, the oil level warning lamp (A1e12) comes on and the readout "-2L" appears flashing.)
  - if oil at minimum: the oil can symbol appears together with the readout "OIL LEVEL MINIMUM". In addition, a brief warning signal sounds. (On models not fitted with multifunction display, the oil level warning lamp (A1e12) comes on.)
- automatically 13 s after ignition ON:
  - if **no oil** is in engine: the oil can symbol appears together with the readout "OIL LEVEL BELOW MIN". In addition, a warning signal sounds. (On models not fitted with multifunction display, the oil level warning lamp (A1e12) comes on and the readout "-2L" appears flashing. In addition a brief warning signal sounds.)

The missing oil quantity displayed no longer changes during the display. In other words, any change in oil level cannot be observed directly at the display. The new oil level is only displayed once the conditions described below exist.

Display of oil quantity at driver request

The text "DISPLAY OIL LEVEL?" appears 10 s after the start switch has been turned into position "2" (on models not fitted with multifunction display, the oil can and the clock symbol are displayed).

If the reset button of the trip counter is pressed twice within one sec. during this readout, for example, "add 1.0L oil" (or "-1.0L")

appears in the display if oil level too low. The readout appears only after the elapse of a waiting time after engine OFF. The waiting time depends on the engine oil temperature.

It is

- up to 20°C 30 minutes
- from 60°C 1 minute
- The waiting time is between these two limits at other engine oil temperatures.

Possible readouts are (text in parenthesis relates to models not fitted with multifunction display.):

- "OIL LEVEL OKAY" ("o.k."),
- 1.0L, 1.5L, 2L,
- "Overfilling" ("HI"),
- "OBSERVE WAITING TIME" (clock symbol flashing and oil can symbol),
- "DISPLAY OIL LEVEL" (clock and oil can symbols.)

If there is a fault at the oil sensor (oil level/temperature/quality, B40) the oil can symbol and the text "OIL LEVEL SENSOR FAULTY" appears only 30 s after the fault has occurred.

(On models not fitted with multifunction display, the oil level warning lamp (A1e12) comes on accordingly.)

For diagnosis, read also the injection system control module (N3) with the HHT. (The instrument cluster (A1) receives the sensor data through the CAN from the injection system control module (N3)).

Oil change

The ASSYST has to be reset each time the oil is changed. Resetting ASSYST also resets the remaining time and the remaining distance. Resetting can be performed at the instrument cluster or using the HHT. The following data are stored when the system is reset:

- current kilometer reading rounded off to 100,
- total oil replenishments in the last interval,
- remaining distance,
- remaining time,
- product of the quality factors,
- the data of the last 5 resettings in 5 data sets

These data can only be read with the HHT!

If the specified quantity of oil is not replenished when the oil is changed, the (internal) start distance is reduced.

Detecting oil replenishments

- With the **HHT** it is possible to retrieve the last 10 oil replenishments and the corresponding kilometer readings of the current interval.
- In the normal case, detection of an oil replenishment is displayed by the remaining distance in the instrument cluster being extended

Oil replenishments are always only detected once the following conditions are met:

the replenished quantity is **at least**

In the charts overleaf, a number of examples of this are presented. The horizontal (x) axis represents the service interval and the vertical (y) axis is the remaining distance in each case in km.

conditions are met:

- the replenished quantity is **at least 1 l**
- after replenishing the oil, the car must be driven a distance of **at least 5 km under normal driving conditions** at an oil temperature of at least 60°C

There are instances, however, in which the readout of the remaining distance nevertheless appears implausible after replenishing oil; according to the display, no bonus or only a small bonus has been issued. This is caused by the fact that the remaining distance is always only displayed within a range from 15 000 km up to 30 000 km (or 20 000 km up to 40 000 km in the case of engine 668), but internally the system calculates with the actual values which may also be beyond this range. These internal values can only be displayed with the HHT.

horizontal (x) axis represents the service interval and the vertical (y) axis is the remaining distance in each case in km.

The readout of ASSYST in the instrument cluster always moves within the light range.

The remaining distance calculated internally may also, however, be within the two dark ranges. These internal values can only be displayed with the HHT.

All examples relate to gasoline engines fitted with an oil sensor.

Example 1 :

Sufficient oil was added during the oil change. This means that the starting distance is 15 000 km.

After 10 000 km oil is topped up under normal driving conditions (a). The bonus (B1) is issued and displayed. What this means is that when the remaining distance is retrieved, a greater remaining distance is displayed. (Provided the aforementioned conditions for detecting the oil replenishment are met.)

Oil is topped up again after a further 5 000 km (b). In this case also a bonus (B2) is issued and displayed.

If, after this, no further oil is topped up and the car continues to be driven in the same manner, a service interval of about 24 000 km is thus achieved.

In this example, the curve moves at all points within the light range of the chart; consequently, all the oil replenishments are displayed by increasing the remaining distance.

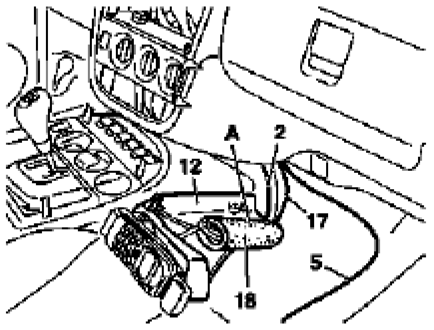


Fig. 322: Engine Oil Monitor Function - (1 Of 4)

Example 2:

The specified quantity of oil was added when the oil was changed.

The car is driven under very favorable conditions and oil is topped up after 10 000 km (a). Internally, the bonus B1 is issued, the service interval is extended accordingly by enlarging the remaining distance. However, as the curve is sometimes within the shaded area, only the part of B1 which is within the light area, is at first displayed as an extension of the remaining distance. (Provided the aforementioned conditions for detecting oil replenishment are met.)

Oil is topped up once again at 18 000 km (b). In view of the fact that the maximum service interval of 30 000 km was exceeded, the bonus B2 is not initially displayed as an extension. The entire service interval in this case is 30 000 km.

If, from point b, the car continues to be driven under less favorable conditions, it may still also be possible now to achieve the maximum service interval of 30 000 km because of the internal bonus B2.

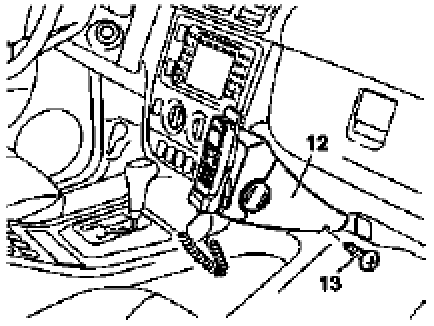


Fig. 323: Engine Oil Monitor Function - (2 Of 4)

Example 3:

When the oil was changed, the quantity added was less than the specified quantity. Consequently, the start distance is less than 15 000 km.

If oil is now topped up after 5 000 km (a), the remaining distance displayed is not extended as the curve is within the shaded area. The bonus B1 is nevertheless added internally and results in an extension of the service interval to slightly more than 15 000 km - provided the driving conditions remain the same or are more favorable.

(The service interval of 15 000 km is always reached, however, even if the internal value were less.)

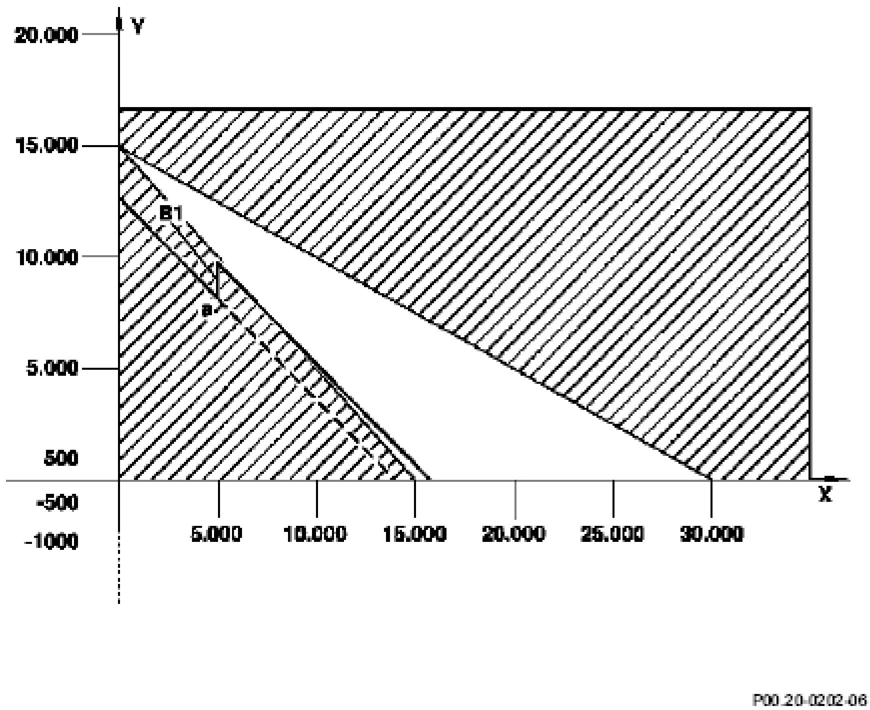


Fig. 324: Engine Oil Monitor Function - (3 Of 4)

Example 4:

Oil has been topped up after 5 000 km under unfavorable driving conditions (a) and the oil replenishment (bonus B1) detected internally. We now have two cases to consider:

- If the car continues to be driven under the same conditions (unbroken line), the remaining distance displayed is not extended as the curve is within the shaded area.

  The service interval in this case is nevertheless 15 000 km although the internal value is less. (The remaining distance displayed can always only be within the light area.)

- If the car continues to be operated under more favorable conditions (broken line), the value of the internal remaining distance slowly moves into the light area. Consequently, the service interval may be greater than 15 000 km.

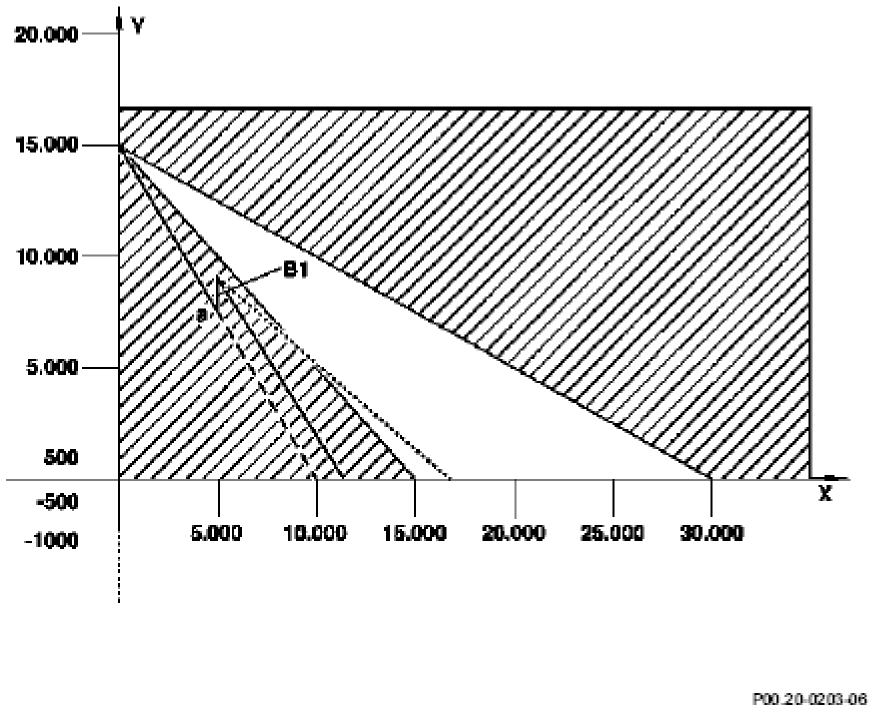


Fig. 325: Engine Oil Monitor Function - (4 Of 4)

	Active service system survey of display facilities		GF00.20-P-0003-04A
	Active service system technology/ influencing variables		GF00.20-P-0003-05A
	Active service system survey model/engine/ sensor/instrument cluster		GF00.20-P-0003-06A
	Active service system (ASSYST) operating instructions, resetting		GF00.20-P-0003-01A
	Oil sensor position/task/function	Oil sensor position, task, function	GF18.40-P-4111A

DISPLAYING SERVICE, FUNCTION - GF00.20-P-2010B

MODEL 129 as of 1.8.99

MODEL 163 as of 1.1.00

MODEL 168 as of 1.9.99

MODEL 170 as of 1.12.99

MODEL 202 as of 1.8.99

Display of service to be performed

In addition to the various service displays, the service work to be performed (A or B) also appears.

The service symbol (wrench) appears once or twice in the display for this purpose.

The service symbol appears

- **once** for service **A**
- **twice** for service **B** .

[i] A service A is always followed by a service B.

Following a service B, the next service must be calculated taking into account the kilometer readings. If the distance of the current service interval is less than 22 000 km, the next service is service A, otherwise service B.

This calculation is now performed **automatically** in the instrument cluster (A1).

The path of the service displayed A or B can be processed in the service sheet without the need for a calculation.

There is no external difference in the instrument clusters with and without the service display.

If service A (one service symbol) is displayed, it is then necessary to ensure by means of the **production date** or the **control unit identifier** , that the vehicle in question is in fact a vehicle **with service display** . If this is not the case, the service must be determined as specified in the service sheet.

The table below shows from which control unit identifier the instrument cluster features the service display:

The control unit identifier can be read with the HHT under menu point Control unit version.

Model	Control unit identifier
129	2/04
163	3/04
168	3/20
170	2/23
202	0/20

	Displaying remaining service function		GF00.20-P-2007A

SAFETY PRECAUTIONS

RISK OF INJURY CAUSED BY PINCHING OR JAMMING WHEN WORKING ON LOADED SPRINGS OR SPRING BODIES - AS00.00-Z-0001-01A

Use only approved clamping devices; shield off hazard area if necessary. Inspect special tools for damage and proper operation (visual inspection). Wear protective gloves.

Risk of pinching and jamming body parts when working on pre-loaded components.

When loosening or removing components that are under significant load, there is a risk of **serious injury** if **non-approved if** clamping devices are used.

Safety instructions/precautions

When conducting repair work on springs, spring bodies, spring-type actuators and other components under tension use **approved clamping devices only** .

Spring compressor

The spring compressor should **never** be clamped or released using an impact wrench.

Check clamping devices

- The spindle must be undamaged and allow ease of movement.
- The clamping plates must not be deformed.
- Note arrangement of clamping plates to springs.
- If the device is damaged or malfunctioning, it must be returned to the manufacturer.

[i] The coil diameter of the spring should match the groove in the clamping plate.

Wear protective gloves during all operations.

RISK OF INJURY. SKIN OR EYE INJURIES MAY RESULT WHEN HANDLING HOT OR GLOWING OBJECTS. - AS00.00-Z-0002-01A

Wear protective gloves, protective clothing and (where necessary) safety glasses.

Risk of injury

Unprotected contact with hot or glowing objects may cause severe burns to the skin and eyes.

If glowing objects come into contact with water, hot steam or hot splashing water may result in severe skin and eye burns.

Severe and possibly permanent injuries may result if hot or glowing objects come into contact with unprotected skin or eyes.

[i] Fire may result if glowing objects come into contact with flammable materials or substances.

Safety precautions/instructions

- Wear protective clothing, safety glasses and heat-resistant gloves.
- Transport hot or glowing objects using approved equipment only.
- When handling glowing objects, avoid sparks and keep objects away from flammable materials and substances.

First aid measures

- Flush the affected skin areas with plenty of cold water and dress with sterile bandages.
- Consult a doctor without delay.

RISK OF DEATH. DEATH MAY OCCUR IF BODY PARTS ARE DRAWN INTO ROTATING VEHICLE PARTS. - AS00.00-Z-0004-01A

Do not reach into rotating parts.

Wear closed and snug-fitting work clothes.

Secure area near rotating vehicle parts against unauthorized access.

Risk of death

Freely rotating parts near the running engine and around the drive train can cause **serious injuries** .

During all work on rotating driven axles the opposite wheel hub spins in rotation as well. This produces a **blind hazard area** that must be protected from unauthorized access.

Safety instructions/precautions

- Wear closed and snug-fitting work clothes.
- Remove all items of jewelry, such as chains, rings, etc.
- Restrain long hair by wearing an appropriate head cover.
- Set up appropriate shielding (e.g. barrier, safety guard) to secure blind hazard areas against unauthorized access.

RISK OF ACCIDENT & RISK OF INJURY - AS00.00-Z-0005-01A

Secure vehicle to prevent it from moving off by itself.

Wear closed and close-fitting work clothes.

Do not grasp hot or rotating parts.

Possible hazards

Risk of accident

from vehicle starting off during starting operation (e.g. when testing compression pressure) **as a result of gear engaged** or when engine running, or vehicles with automatic transmission **as a result of selector lever position "P" or "N" not engaged** (exception: some vehicles do not have a selector lever position **"P"**).

Injury hazard

Severe injuries may be caused by unshielded rotating parts in the area of the running engine.

The heat produced by the running engine can result in severe burns if contact is made with individual, unshielded parts.

Procedural guidelines and safety precautions

- As a general rule, carry out work on the running engine only if this is absolutely necessary.
- Before starting the engine, **apply parking brake** .
- On models with manual transmission **move gearshift lever into Neutral position** .
- On vehicles with automatic transmission **move selector lever into position "P" or "N"** (exception: some vehicles do not have a selector lever position **"P"**).
- On models which **do not have selector lever position "P", secure selector lever to prevent it from being operated unintentionally** .
- Wear closed and close-fitting work clothes.
- All items of jewelry like chains or rings must be taken off.
- Restrain long hair by wearing an appropriate head cover.
- Before commencing any work on the running engine, familiarize yourself with the location of potentially hot parts.
- When carrying out work when starting the engine or when engine is running **do not touch any hot and rotating parts** .

First aid measures in the event of burns

- Do not rub the skin areas affected; flush with plenty of cold water and cover skin with sterile bandages.
- Consult a doctor without delay.

RISK OF INJURY CAUSED BY DRILLING GAS-FILLED ASSEMBLIES OR COMPONENTS (NONCOMBUSTIBLE GASES) - AS00.00-Z-0006-01A

Wear safety glasses and a face mask.

Risk of injury when drilling

There is an increased risk of injury to the skin and eyes when drilling gas-filled assemblies due to shavings being thrown out. The shavings are picked up by the escaping gases and accelerated to a greater or lesser extent depending on the pressure. The extent of injuries increases as the pressure increases. The pressures involved

may be 75 bar or more.

Safety instructions/precautions

- Wear safety glasses and a face mask.

First aid measures

- Do not rub any skin areas affected, as there is the risk that the shavings will break off leaving some of them behind.
- If necessary, consult a physician.

THE HIGH VOLTAGE USED FOR ARC WELDING PRESENTS A LETHAL HAZARD - AS00.00-Z-0007-01A

Use insulating mats. Wear protective clothing, safety glasses, and protective mask. Remove highly inflammable materials from the danger zone. Use air extractor.

Possible hazards

Lethal hazard from high voltage used for arc welding.

If arc welding work is performed in moist surroundings or on a wet surface, electricity conducted through the human body may pose a **lethal hazard** . This can result in severe burns, heart fibrillation or cardiac arrest.

⚠ Danger! **Persons with heart pacemakers should not perform arc welding work.**

Risk of explosion!

Welding in the area of highly inflammable substances can cause explosions.

Risk of injury from welding spatter and UV light when welding as well as from flying sparks when grinding

Severe burns can be caused if hot chips (flying sparks) from grinding or welding sparks or spatter from liquid welding material come into contact with unprotected body parts.

Normal work clothing (consisting of cotton or synthetic fiber) can ignite from welding sparks and spatter from liquid welding material or from flying sparks when grinding and cause severe burns.

The UV light emitted during arc welding can lead to eye damage and burns on unprotected skin.

Risk of poisoning from inhaling welding gases

Inhaling the vapors resulting from combustion while welding can lead to headache, nausea, dizziness and unconsciousness.

Procedural guidelines and safety precautions

- Wear safety shoes (with rubber soles) and use insulating mats.
- Ensure a good ground connection is present.
- Persons with heart pacemakers should not perform arc welding work.
- Remove highly inflammable materials, substances and fluids from the danger zone.
- Wear appropriate protective clothing (leather, Kevlar), head covering (welding mask or helmet with suitable glasses), welding apron and protective gloves.
- Perform welding work in well ventilated rooms only.
- Wear respiratory mask or use air extractor.

First-aid measures

- Rinse affected skin with large quantities of cold water and cover with sterile bandages.
- Bring unconscious persons immediately into the fresh air and provide artificial respiration, if necessary.
- Consult a doctor without delay.

RISK OF ACCIDENT & RISK OF INJURY - AS00.00-Z-0008-01A

Ensure that jack stands have secure and adequate footing.

An authorized person must occupy the driver's seat.

Wear closed and snug-fitting work clothes.

Do not grasp hot or rotating parts.

Potential risks

Risk of accident

caused by vehicle driving off on its own when under operation (e.g. during tests) with engine running and gear engaged. **Danger caused by vehicle falling off the jack stands** .

Risk of injury

Caused by exposed rotating parts next to the running engine and around the drive train which can cause **serious injuries** .

The heat produced by the running engine can result in severe burns if contact is made with individual, unshielded parts.

Safety instructions/precautions

- The danger zones around and in the vehicle may only be entered by persons required to conduct the work.

  To perform the work, climb into cab.

- Raise vehicle so that the wheels are not touching the ground when operating vehicle.
- A person should be sitting in the cab who is acquainted with the vehicle controls and who can initiate appropriate measures.
- When jacking up vehicle, make sure that the jack stands are positioned on solid ground and that they are secure.
- The vehicle must be securely positioned on the bearing surfaces, where necessary anti-slip bases should be placed on the surface.
- Wear closed and close-fitting work clothes.
- All items of jewelry like chains or rings must be taken off.
- Restrain long hair by wearing appropriate head cover.
- Before commencing any work on the running engine, familiarize yourself with the location of potentially hot parts.
- When carrying out work when the engine is running **do not touch any hot and rotating parts** .

First aid measures for burns

- Flush the skin areas affected with plenty of cold water and cover skin with sterile burn bandages. Do not apply the bandages tightly, but rather loosely over the affected skin area. Do not use any frayed bandages (e.g. old dressing material). Do not rub the affected skin areas.
- Consult a physician immediately.

RISK OF INJURY. MOVING PARTS CAN PINCH, CRUSH OR, IN EXTREME CASES EVEN SEVER EXTREMITIES. - AS00.00-Z-0009-01A

No parts of the body or limbs should be within the operating range of the mechanism when moving components.

Risk of injury

When working on components which can be moved either by hand, by means of electric motors, or hydraulically/pneumatically via linkage, serious injuries can occur to body parts being trapped, crushed or severed.

Safety instructions/precautions

- Monitor hazard area.
- Secure area against unauthorized access when parts are in motion.
- Never touch the mechanism of a component while it is being actuated by electric motors via STAR DIAGNOSIS or by direct actuation (terminal 30).
- Choose a test cable of sufficient length.

RISK OF DEATH CAUSED BY VEHICLE SLIPPING OR TOPPLING OFF OF THE LIFTING PLATFORM. - AS00.00-Z-0010-01A

Align vehicle between the columns of the lifting platform and position the four support plates at the lifting platform support points specified by the vehicle manufacturer.

RISK OF ACCIDENT AND INJURY

Please make sure that:

- The vehicle is centered lengthwise and crosswise between the lifting platform columns.
- The support plates on the lifting platform support points are all positioned at the same height.
- The vehicle is first raised a few inches (wheels are still touching the ground) and the position and fit of the support plates and lift points are checked before raising the vehicle to the full lifted position.
- The vehicle is not raised off the lifting platform plates when components are being supported.

If the arms of the lifting platform or the support plates are not positioned properly, or if components of the vehicle are supported so that the vehicle raises off the platform, then the vehicle can slip off the platform and cause life-threatening injuries to you or other people.

Before removing axles and assemblies from the vehicle, make sure the vehicle is secured to the platform or that sand bags are used to balance the vehicle out.

Otherwise the vehicle could tip because of the uneven distribution of weight. This could cause life-threatening injuries to you or other people.

NOTE: **In Germany, lift platform operators must observe the following regulations and guidelines: "Berufsgenossenschaftvorschrift (BGV) D29 fur Hebebuhnen" and the guidelines issued by the lift platform manufacturer. In other countries, operators must comply with all relevant statutory and accident prevention regulations.**

RISK OF INJURY CAUSED BY FINGERS BEING JAMMED OR PINCHED WHEN REMOVING, INSTALLING OR ALIGNING HOODS, DOORS, TRUNK LID/ REAR-END DOOR OR SLIDING ROOF. - AS00.00-Z-0011-01A

When moving components, ensure that no body parts or limbs are within the operating range of moving parts.

Risk of injury

When working on hoods, doors, trunk lids/tailgates and sliding roofs and on their connecting mechanisms, serious injuries can occur due to cutting, jamming or pinching of body parts like fingers and hands.

Safety instructions/precautions

- Be careful when working in hazardous areas.
- When moving components, secure the movement area of the mechanism to prevent interference.
- Use special tool or other means to ensure safe distance to dangerous areas.

- Wear protective gloves

RISK OF INJURY FROM FINGERS BEING PINCHED OR JAMMED WHEN WORKING ON GAS STRUTS UNDER PRESSURE - AS00.00-Z-0012-01A

Remove and install gas struts only in relaxed position and on components which have been secured properly.

Injury hazard

Risk of injury from pinching or crushing when working on gas struts under pressure.

When removing and installing gas struts not in the relaxed position injury can result to body parts from pinching, crushing or jamming.

Rules of behavior/protective measures

- Remove and install gas struts only in relaxed position (pressure or thrust rod completely extended).
- Support components held by gas strut (tailgates, doors, trunk lids, seat frame, etc.) in position by suitable means before removing gas struts.
- Replace damaged retaining clips or keepers.
- When moving components secure motion area of mechanism against reaching in.

RISK OF INJURY & RICK OF POISONING - AS00.00-Z-0013-01A

Depressurize the hydraulic system completely before starting any work on the system. Wear protective clothing and eye protection.

Possible hazards

Risk of injury

When disengaging hydraulic lines without first depressurizing the system, dangerous skin or eye injuries may occur due to the very high pressures (in excess of 200 bar). If hydraulic fluid, particularly central hydraulic fluid (especially harmful), comes into contact with unprotected skin, this may cause damage to the skin.

Risk of poisoning

If hydraulic fluid is swallowed, this may lead to poisoning symptoms such as headache, giddiness, abdominal pain, vomiting, diarrhea, cramps and unconsciousness.

Protective measures/guidelines

- When commencing work on hydraulic systems, these must be depressurized; the system must be drained if necessary.
- Do not pour hydraulic fluid into beverage containers.

- Ensure sufficient ventilation, especially in the case of central hydraulic fluid.
- Ensure that only authorized persons have access to hydraulic fluid.
- Immediately seal disconnected leads and hoses, and the connections to the assemblies, with blind plugs.

  Wear protective gloves, protective clothing and eye protection.

If protective gloves cannot be worn, the following points must be noted:

- Only expose skin to hydraulic fluid for as brief a period as possible; in the event of contact with skin, clean skin with soap and water.
- In the event of contact with clothing, replace clothing as rapidly as possible.

First-aid measures

- Have the person affected drink plenty of water with activated charcoal additive.
- After swallowing large volumes, seek the attention of a physician.
- If hydraulic fluid gets into the eyes, immediately rinse the eyes with plenty of clean water/eye rinsing bottle.
- In the event of injuries to the skin or eyes due to a jet of hydraulic fluid, immediately seek the attention of a physician.

RISK OF INJURY. RUBBER MOUNTS AND BEARING PARTS CAN SUDDENLY COME LOOSE DURING INSTALLATION/REMOVAL AND SHOOT WILDLY THROUGH THE AIR. - AS00.00-Z-0014-01A

Shield hazard area with suitable catch device (basket, grate box). Also ensure that no unauthorized persons are present in the hazard area.

Risk of injury

When installing and removing tight transverse control arm mounts, the rubber mounts can be put under extremely high tension. If one of the mounts is released suddenly it can shoot out of the installation bore hitting and injuring anyone in the immediate area.

Safety precautions/instructions

- When pressing parts in and out ensure that no one is in the immediate vicinity and therefore in the hazard area except for the person performing the work.
- Also secure the pressing point (hazard area) with a suitable catch device (basket, grate box).
- When pressing out loosen mount by tapping a number of times with a hammer. Press out in a number of intervals relieving the pressure in between.

RISK OF EXPLOSION FROM PRESSURIZED SPRAY CANS - AS00.00-Z-0015-01A

Protect cans from direct sunlight and temperatures above 50°C

Risk of explosion

Spray cans (engine compartment preservative, paints, etc.) are pressurized and can explode when heated up to above 50°C.

Safety instructions/precautions

- Protect cans from direct sunlight and temperatures above 50°C. Do not drill or burn the can after use.
- Only use in well ventilated areas, wear respiratory protection if necessary.

RISK OF POISONING & RISK OF INJURY - AS00.00-Z-0016-01A

Wear respiratory protection, protective gloves and safety glasses. Only pour glue into suitable and appropriately marked containers.

Potential risks

Risk of poisoning

When glue vapors are inhaled , the respiratory system could be damaged because even small amounts of the substances contained in some types of glues can attack the mucous membranes.

Swallowing glue can cause poisoning symptoms such as headaches, dizziness, cramps, stomach aches, vomiting, respiratory paralysis and unconsciousness. Moreover, irritation may occur to the respiratory paths and eyes.

Risk of injury

Most adhesives can glue limbs and eyelids as well as cause severe irritation to skin and eyes.

Safety precautions/instructions

- Before applying adhesives, ensure that you have complied with all use and safety instructions; obtain the safety data sheet from the manufacturer if required.
- Perform gluing work only in well ventilated rooms.
- No fire, sparks, open flames or smoking.
- Wear protective gloves and eye protection, if necessary respiratory protection and protective clothing.
- Do not fill glue into beverage cups
- Store glue where it is not accessible for unauthorized persons.

First aid measures

Eye contact

- Immediately rinse eyes thoroughly with running, lukewarm water and contact a physician.

Skin contact

- Remove moistened clothing.
- Immediately wash affected skin areas with warm water and soap.

Swallowed glue

- Rinse out mouth Drink large quantity of water.
- Contact physician or medical service.

INJURY HAZARD OF CUTTING OR SCRAPING ON SHARP VEHICLE PARTS - AS00.00-Z-0017-01A

When working on or in the area of sharp vehicle parts with burrs always wear protective gloves. Deburr repair panels.

Injury hazard

When working on body, superstructure, assembly and chassis parts which cannot be or are not yet deburred due to the production procedure or processing stage, injuries are possible from cutting, scratching or scraping against the burr.

Rules of behavior/protective measures

- Wear protective gloves.
- Deburr repair panels and processed cut edges.

RISK OF DEATH CAUSED BY BODY PARTS BEING PULLED IN BY ROTATING VEHICLE WHEELS AND ROLLER DYNAMOMETER ROLLERS - AS00.00-Z-0019-01A

Do not insert your hand into rotating parts. Wear closed and snug-fitting work clothes. Safeguard areas with rotating vehicle parts and dynamometer rollers against unauthorized access. Safeguard roller dynamometer from unauthorized access.

Risk of death

Rotating parts in and around the running engine and the drive train as well as rotating dynamometer rollers and vehicle wheels can cause **serious injury** .

When performing operations on the roller dynamometer, appropriate shielding (barriers, safety guards) must be used to protect blind hazard zones from unauthorized access.

Safety instructions/precautions

- Always observe the general safety rules for roller dynamometer operation.
- Wear closed and close-fitting work clothes.
- Remove all items of jewelry (chains, rings, etc.).

- Restrain long hair by wearing an appropriate head cover.
- Operate roller dynamometers only within the prescribed capacity limits.
- Ensure that all persons remain outside of the hazard zone of rotating wheels, shafts and dynamometer rollers when the dynamometer is in or ready for operation.
- During testing, the driver's seat may only be vacated in case of emergency.
- When not in use, protect roller dynamometers from unauthorized use by locking the main switch.
- If the roller dynamometer used has an integrated workpit, the pit must be sealed off after use.

RISK OF DEATH CAUSED BY CONTACT WITH PARTS CONDUCTING HIGH VOLTAGES. - AS00.00-Z-0020-01A

Do not touch parts which conduct high voltages. Persons who wear electronic implants (e.g. heart pacemakers) must not perform any work on such components.

Risk of death caused by electric shock

Electric shocks can cause fibrillation of the heart or even cardiac arrest. The effects of an electric shock may sometimes first appear after several minutes have gone by; for this reason always seek medical attention.

Safety instructions/precautions

Persons who wear electronic implants (e.g. heart pacemakers) must **not** carry out any work on such components.

- Do not touch parts which conduct high voltages.
- When working on such components, for example:
  - connecting and disconnecting electrical components
  - replacing parts
  - connecting test equipment

  it is first of all necessary to disconnect the ground cable from the battery.

RISK OF DEATH CAUSED BY COMING INTO CONTACT WITH COMPONENTS OF A 220 V SYSTEM - AS00.00-Z-0021-01A

Do not touch voltage conducting parts in of a 220 V system

Risk of death caused by electric shock

Risk of death caused by coming into contact with electrical parts of the 220 V system. Electric shocks can cause fibrillation of the heart or even cardiac arrest. It may also take several minutes for the consequences of an electric shock to show themselves; for this reason

always contact a doctor.

Risk of injury caused by burns

Electric shock or direct body contact with a power source can lead to burns or scalding.

Safety instructions/precautions

Never connect the 220 V power supply to an outside socket during any repair work.

Do not touch any conductive parts of the 220 V system.

Before beginning any work always:

- Disconnect the 220 V system
- Ensure that the 220 V system cannot be reactivated
- Ensure that no voltage is present
- Ensure that the parts you are working on are grounded and short circuited

All repair work should be performed only by a trained electrician or under the direction and supervision of a trained electrician.

Persons who wear electronic implants (e.g. heart pacemakers) must **not** carry out any work on such components.

When performing any repair work on the 220 V system, proper insulated protective clothing must be worn and insulated tools and protective devices must be used as per the safety regulations.

[i] Observe country-specific regulations.

First aid measures

The shocked person must be immediately removed from the electric circuit.

Use protective gloves and a wood board or a wood ladder to push or move the shocked person out of the danger zone.

[i] First attempt to turn off the power.

- Check for breathing. If there is no breathing or insufficient breathing, the preferable action is to perform mouth-to-mouth resuscitation. If necessary, carry out CPR.
- If victim is unconscious, but breathing, place victim in the recovery position.
- Sterile bandages for burns.

[i] If any of these symptoms occur, consult a physician immediately.

RISK OF DEATH CAUSED BY WORK PERFORMED ON LIQUEFIED GAS SYSTEMS - AS00.00-Z-0022-01A

Before commencing any work, ensure that all sources of ignition have been eliminated. Wear protective

clothing, safety gloves and eye protection

Potential risks

Risk of death

Risk of explosion caused by liquefied petroleum gas leaking out of the system in closed rooms or when gas the tank is overheated due to work being done.

Risk of burn injuries caused by explosions.

Risk of frostbite to skin and body parts caused by liquefied petroleum gas spraying out and by coming into contact with components that are near the valve when the tank is being emptied. **Risk of poisoning** or **risk of suffocation** caused by inhaling liquefied petroleum gas.

Safety instructions/precautions

- Wear protective clothing, safety gloves and eye protection
- Keep suitable fire extinguishing equipment at hand
- Keep any flammable materials and objects away from the equipment
- Avoid making any sparks
- Perform a fire check of the surroundings after work has carried out
- Never perform work in closed rooms

Before commencing any work, ensure that all sources of ignition have been eliminated. Ensure adequate ventilation of the immediate area around the vehicle.

[i] Adequate ventilation means an exchange of air at least 3 times an hour at a distance of 3 meters from the gas shutoff valve.

Close the gas shutoff valves at the compressed-gas tanks before commencing repair work.

Close off gas tank valve if vehicle is to remain in closed rooms, e.g. in halls or garages, for longer periods of time.

Maintenance and repair work may only be carried out by specially trained personnel.

Due to the fact that explosions can occur when the gas system has leaks, a leak test must be performed before restarting the system after repairs have been done in which the pipes and lines of the gas system have been opened.

In the Federal Republic of Germany, this leak test can only be performed by specially trained DVFG personnel as per the DVGW Work Sheet G 607.

(DVFG - German Liquefied Petroleum Gas Association)

(DVGW - German Technical and Scientific Association for Gas and Water)

i Observe country-specific regulations.

First aid measures:

Move the victim out of the risk area.

If eyes are affected immediately and thoroughly wash out eyes (making sure that eye lids are open) with plenty of clean water.

If skin is affected drench with water. The victim must be kept warm and calm.

If inhaled , and if drowsiness, headaches, visual problems or irritation of the eyes, nose and throat occur, remove victim to fresh air. Place unconscious victims in the recovery position and check for breathing and pulse. If there is no breathing or insufficient breathing, the preferable action is to perform mouth-to-mouth resuscitation. If necessary, carry out CPR.

i For any of these symptoms immediately call a doctor.

SAFETY INFORMATION: OVERALL VEHICLE - AS00.00-Z-9999ZZ

MODEL all

⚠ Danger!	Risk of injury caused by pinching or jamming when working on loaded springs or spring bodies	MODEL all	**AS00.00-Z-0001-01A**
⚠ Danger!	Risk of injury caused by scraping or cutting body parts on sharp vehicle parts	MODEL 903 ...	AS00.00-Z-0017-01B
⚠ Danger!	Risk of explosion caused by escaping natural gas or an overheated compressed-gas tank when working on natural gas powered vehicles. Risk of frostbite to body parts caused by escaping natural gas or contact with components near the valves when draining compressed-gas tanks. Risk of poisoning or suffocation caused by inhaling natural gas.	MODEL 211 with CODE (924) Bivalent natural gas drive	AS00.00-Z-0018-01B
⚠ Danger!	Risk of death caused by	MODEL all	**AS00.00-Z-0021-01A**

	coming into contact with components of a 220 V system		
Danger!	Risk of death caused by work performed on liquefied gas systems	MODEL all	**AS00.00-Z-0022-01A**
Danger!	Risk of injury. Skin or eye injuries may result when handling hot or glowing objects.	MODEL all	**AS00.00-Z-0002-01A**
Danger!	Risk of injury when handling liquid nitrogen or from touching extremely cool objects. Risk of asphyxiation from inhaling nitrogen gas.	MODEL all	AS00.00-Z-0003-01A
Danger!	Risk of death. Death may occur if body parts are drawn into rotating vehicle parts.	MODEL all	**AS00.00-Z-0004-01A**
Danger!	Risk of accident as vehicle may start off by itself with the engine running. Risk of injury as working around the engine during start-up or while running may result in contusions and burns	MODEL all	**AS00.00-Z-0005-01A**
Danger!	Risk of injury caused by drilling gas-filled assemblies or components (noncombustible gases)	MODEL all	**AS00.00-Z-0006-01A**
Danger!	The high voltage used for arc welding presents a lethal hazard. Explosion hazard when welding in the area of highly combustible materials. Risk of injury from weld splatter and UV light when welding. Risk of poisoning when inhaling welding vapors.	MODEL all	**AS00.00-Z-0007-01A**
Danger!	Risk of accident caused by vehicle starting off on its own when jacked up. Risk of injury caused by rotating parts when working on	MODEL 906, 613, 671, 171, 203, 209, 164, 169, 219, 245, 251	**AS00.00-Z-0008-01A**

	running engine or drive train.		
⚠ Danger!	Risk of injury. Moving parts can pinch, crush or, in extreme cases even sever extremities.	MODEL all	**AS00.00-Z-0009-01A**
⚠ Danger!	Risk of injury caused by fingers being jammed or pinched when removing, installing or aligning hoods, doors, trunk lid/rear-end door or sliding roof.	MODEL all	**AS00.00-Z-0011-01A**
⚠ Danger!	Risk of injury from fingers being pinched or jammed when working on gas struts under pressure	MODEL all	**AS00.00-Z-0012-01A**
⚠ Danger!	Risk of injury to skin or eyes from hydraulic fluid spraying out under pressure. Risk of poisoning from swallowing hydraulic fluid.	MODEL all	**AS00.00-Z-0013-01A**
⚠ Danger!	Risk of injury. Rubber mounts and bearing parts can suddenly come loose during installation/ removal and shoot wildly through the air.	MODEL all	**AS00.00-Z-0014-01A**
⚠ Danger!	Risk of explosion from pressurized spray cans	MODEL 100, 107, 108, 109, 111, 112, 113, 114, 115, 116, 123, 124, 126, 129, 140, 163, 168, 170, 201, 202, 208, 210, 215, 216, 220, 221, 251 ...	**AS00.00-Z-0015-01A**
⚠ Danger!	Risk of poisoning caused by inhaling vapors or swallowing adhesive. Risk of injury caused by glue coming into contact with skin and eyes	MODEL 163, 169, 199, 204, 209, 211, 215, 216, 219, 221, 240, 245, 397, 461, 463, 613, 638, 639, 671, 684, 901, 902, 903, 904 ...	**AS00.00-Z-0016-01A**
⚠ Danger!	Injury hazard of cutting or scraping on sharp vehicle parts	MODEL all	**AS00.00-Z-0017-01A**
⚠ Danger!	Risk of explosion caused by escaping natural gas or an overheated compressed-gas tanks when working on	MODEL 901, 902, 903, 904, 957.	AS00.00-Z-0018-01A

	natural gas powered vehicles. Risk of frostbite to body parts caused by escaping natural gas or contact with components near the valves when draining compressed-gas tanks. Risk of poisoning or suffocation caused by inhaling natural gas. 6/07 G/02/07. This WIS printout will not be recorded by the updateservice.		
⚠ Danger!	Risk of explosion caused by liquefied petroleum gas escaping or pressurized gas reservoirs overheating when working on vehicles operated with liquefied petroleum gas. Risk of frostbite to body parts caused by liquefied petroleum gas exiting under pressure. Risk of poisoning or risk of suffocation caused by inhaling liquefied petroleum gas.	ENGINE 111.984 For Fluid Gas Concern	AS00.00-Z-0023-01A
⚠ Danger!	Risk of injury caused by burns to skin and eyes. Risk of poisoning caused by inhaling fumes when working with heat-shrinkable tubing.	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 204, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 374, 375, 414, 450, 454, 461, 463, 638, 690, 901, 902, 903, 904, 905, 930, 932, 933, 934, 940, 942, 943, 944, 950, 952, 953, 954, 957, 958, 970, 972, 974, 975, 976 ...	**AS00.19-Z-0001-01A**
⚠ Danger!	Risk of injury caused by burns to skin and eyes, risk of poisoning caused by inhaling fumes during soldering.	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AS00.19-Z-0002-01A**

⚠ Danger!	Risk of death caused by vehicle slipping or toppling off of the lifting platform.	MODEL all	**AS00.00-Z-0010-01A**
⚠ Danger!	Risk of death caused by body parts being pulled in by rotating vehicle wheels and roller dynamometer rollers	MODEL all	**AS00.00-Z-0019-01A**
⚠ Danger!	Risk of death caused by contact with parts conducting high voltages.	MODEL 129, 163, 164, 169, 170, 171, 202, 203, 208, 209, 210, 211, 215, 219, 220, 221, 230, 251 ...	**AS00.00-Z-0020-01A**
⚠ Danger!	Risk of injury caused by body parts becoming jammed, pinched or severed by doors, covers, flaps or by loose components	MODEL 903 ...	AS00.00-Z-0025-01A
⚠ Danger!	Risk of injury to skin and eyes from handling hot or glowing objects. Risk of fire caused by contact of glowing objects with flammable materials.	MODEL 903 ...	AS00.00-Z-0026-01A
⚠ Danger!	Risk of death caused by coming into contact with electrical parts of the 110V system. Risk of injury caused by burns, which can be produced by electrical shocks or by body parts coming in direct contact with electrical currents.	MODEL 903 ...	AS00.00-Z-0027-01A
⚠ Danger!	Risk of injury to hands or eyes when working on hydraulic pressure reservoir systems caused by hydraulic fluid to specification 345.0 spraying out under pressure	MODEL all	AS00.00-Z-0028-01A

RISK OF INJURY & RISK OF POISONING - AS00.19-Z-0001-01A

Work in well ventilated rooms only. Wear safety glasses with side protection and protective gloves.

Potential risks

Risk of injury

When working with heat-shrinkable tubing, excessive temperatures may cause burns to skin and eye.

Risk of poisoning

When working with heat-shrinkable tubing, vapors may be produced which lead to symptoms of poisoning such as coughing, headaches, dizziness and nausea. Moreover, irritation may occur to the respiratory paths and eyes.

Safety precautions/instructions

- Work only in well ventilated rooms.
- Avoid overheating the heat-shrinkable tubing.
- Stop heat-shrinking immediately if the shrink hose becomes blistered or charred or shows other signs of damage.
- Do not inhale the vapors.
- Avoid contact with melted shrink tubing.
- Wear safety glasses with side protection and protective gloves.

First aid measures

When eyes or skin come in contact with melted shrink tubing

- Flush the affected area immediately with plenty of water for approx. 15 minutes.
- Treat affected areas like burn wounds. Do not remove any burned parts.
- Contact physician or medical service.

When vapor is inhaled:

- Take victim to fresh air.
- Keep victim calm and cover with a blanket.
- Contact physician or medical service.

Fire protection measures

Suitable extinguishing agents

- Water mist, general-purpose foam, powder, carbon dioxide
- Protective equipment for firefighters (compressed air equipment, oxygen apparatus, chemical resistant protective clothing)

RISK OF INJURY & RISK OF POISONING - AS00.19-Z-0002-01A

Wear protective gloves, protective clothing and safety glasses. Ensure that the work area is adequately

ventilated. Secure power supply cables. Avoid sources of fire in working area.

Potential risks

Risk of injury

- Contact with hot objects without suitable protective clothing causes severe burns to the skin and eyes.
- Melted, spraying and dripping soldering tin can cause injuries to skin and eyes.
- Electric shock may occur if network or high-voltage lines become scorched or cut by sharp objects.

Risk of poisoning

- Caused by inhaling the vapors of the soldering additives, in particular fluxes.

Fire hazard

- Caused by igniting combustible materials and objects located close to the soldering equipment.

Safety instructions/precautions

- Wear suitable protective work clothing and protective gloves.
- Wear safety glasses.
- Protect power supply cable against heat and sharp edges.
- Create safe work surface for putting down hot tools and objects.
- Do not use soldering tool in wet or damp environments.
- Avoid unintentional operation.
- Switch off equipment after use.
- Do not work on parts that are under voltage.
- Use available soldering fume extractors.
- Only perform soldering operations in well-ventilated rooms.
- Keep combustible objects away from the workplace.
- When working with soldering materials, do not eat, drink, smoke, and sniff. Keep well away from food.

First aid measures

- Do not rub affected areas of the skin; pour plenty of lukewarm water over affected areas and cover over with sterile bandages.
- Move unconscious victim immediately to fresh air and provide artificial respiration, if necessary.
- With severe injuries, call a doctor immediately.

SELF-DIAGNOSTIC SYSTEM

CONNECTING AND USING TEST EQUIPMENT - AD00.00-P-1000AZ

MODELS 124, 129, 140, 163 up to 30.11.99, 163 as of 1.9.01, 168, 170, 201, 202, 208, 210, 215, 220

0.0 [] 1	Key to diagnostics symbols		**AD00.00-P-2001A**
0.0 [] 2	Diagnosis assignment	except models 215, 220	**AD00.00-P-2002A**
0.0 [] 3	Connect test equipment diagnosis	except model 215	**AD00.00-P-2003A**
0.0 [] 4	Diagnostic procedure	only for vehicle systems that can be diagnosed using STAR DIAGNOSIS	**AD00.00-P-2004A**

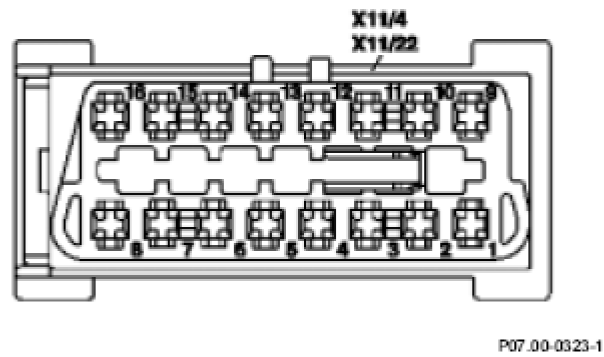
EXPLANATION OF SYMBOLS FOR TESTERS AND COMPONENTS - AD00.00-P-2000-01A

Description	Logo	Description	Logo	Description	Logo
ABS Adapter		***Battery***		***Short-circuit***	
35-pin socket box		***Direct current generator***		***Short-circuit to ground***	
126-pin socket box		***Direct current motor***		***Open-circuit***	-//-
Function generator		***Capacitor***		***Multimeter alternating voltage type of measurement***	
Hand-Held Tester		***Coil***		***Multimeter resistance type of measurement***	
Pulse counter		***Resistance***		***Function generator square-wave signal shape***	
Lambda control tester		***Ground***		***Function generator sinusoidal signal shape***	
Pressure gauge		***In order***	√	***Oscilloscope***	
Multimeter		***Fault***	F	***Adapter cable with light-emitting diode***	
Decade resistor		***Greater than***	>	***Multimeter direct current type of measurement***	
Bridge		***Less than***	<	***Multimeter alternating current type of measurement***	

Hazardous voltage		*Short-circuit to positive*		*Multimeter direct voltage type of measurement*	
Brake lining wear indicator		*Plug*		*Socket*	

Description	Logo	Description	Logo	Description	Logo
Program heating (1st cut-in time)	1	*Air up and down*		*Air Drying*	
Program heating (2nd cut-in time)	2	*Standard setting*		*Cooling mode (standard setting)*	
Cut-in time	1 FR 20:45	*Economy setting*		*Air conditioning Off*	EC
Time of day display		*Air to center and side outlet*		*Air conditioning On/Off (USA only)*	A/C
Instant heat		*Minimum air volume*		*Off (no air supply)*	O
Return flow		*Maximum air volume*		*° Celsius*	C
Supply		*Automatic blower control*		*° Fahrenheit*	F
Air upwards		*Defrosting*		*Residual heat*	REST
Air upwards, downwards, doors		*Automatic mode*	AUTOMATIC		
Air downwards		*Recirculated air*			

ASSIGNMENT OF DATA LINK CONNECTOR - AD00.00-P-2000-02C



X11/22		Data link connector
1		Electronic ignition/starter switch control module (model 168)
2		-
3		TNA signal (gasoline)
3		TD signal (diesel)
4		Circuit 31 (ground)
5		Circuit 31 (electronics ground)
6		CAN interior bus (H)
7	ME	Motor electronics (ME-SFI)
8		Circuit 87 voltage
9	ABS	Anti-lock brake system (model 168)
9	ETS	Electronic traction system (model 163)
9	ASR	Acceleration slip regulation (model 168)
9	ESP	Electronic Stability Program
10		-
11	ETC	Electronic transmission control
11	FTC	Front transmission control (model 168)
11		Automatic clutch (model 168)
12	AAM	All activity module
12	RD	Radio Audio 10, Audio 30, and Audio 30 APS with D2B (model 168)
13	AB	Airbag/emergency tensioning retractor
14		CAN interior bus (L)
15	IC	Instrument cluster
16		Circuit 30 voltage 30

Fig. 326: Identifying Data Link Connector

CONNECTING HAND-HELD TESTER (HHT), READING OUT FAULT MEMORY - AD00.00-P-2000-03A

Commercially available tools

Number	Designation	
WH58.30-Z-1036-13A	Handheld tester (HHT)	651 100 01 99
WH58.30-Z-1037-13A	Test cable (multiplexer)	651 100 40 99

1. Connect Hand-Held Tester (087) with test cable (Multiplexer) (094) to data link connector (DTC readout) (X11/4).
2. Switch on ignition.
3. According to instructions on display:
    a. Read out/erase fault memory
    b. Read out actual values
    c. Perform actuations
    d. Program control modules
4. Disconnect HHT.

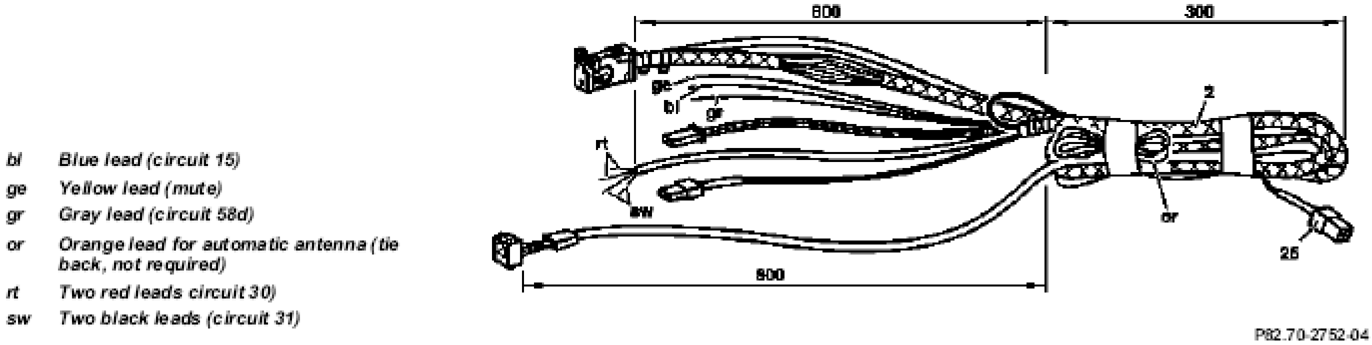


Fig. 327: Connecting Hand-Held Tester (HHT) For Reading Out Fault Memory

i Observe system-specific deviations which are listed for the appropriate diagnosis description in the chapter "Advanced Information on diagnosis".

Stored faults which can be caused by disconnected cables or a simulation during test work must be erased in the fault memory upon completion of the work.

CONNECT HAND-HELD TESTER (HHT), READ OUT DIAGNOSTIC TROUBLE CODE MEMORY - AD00.00-P-2000-03C

Model 163 up to 31.08.01

Model 168

Commercially available tools

Number	Designation	
WH58.30-Z-1036-13A	Handheld tester (HHT)	651 100 01 99
WH58.30-Z-1037-13A	Test cable (multiplexer)	651 100 40 99
WH58.30-Z-1044-13A	Adapter cable (HHT) for datalink connector (X11/4, 16-pin)	

1. Connect hand-held tester (087) to diagnosis test connector (X11/4) in interior using test cable (multiplexer) (094) and adapter cable (107).
2. Switch on ignition.
3. According to instructions in display:
    a. Read out/erase fault memory
    b. Read out actual values
    c. Perform actuations
    d. Program control modules
4. Disconnect HHT.

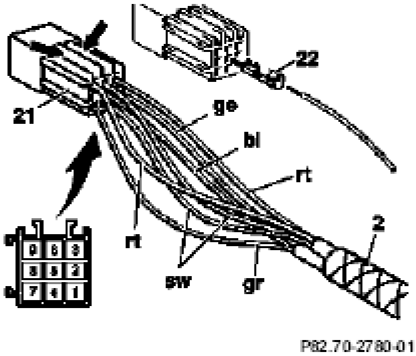


Fig. 328: Connecting Hand-Held Tester (HHT) For Read Out Diagnostic Trouble Code Memory

i Note system-specific deviations listed in respective diagnosis description in chapter entitled "Diagnosis Previous Knowledge".

Stored faults possibly caused by cables being disconnected during testing or by simulation must be erased from the fault memory once the work is completed.

CONNECT STAR DIAGNOSIS AND READ OUT FAULT MEMORY - AD00.00-P-2000-04A

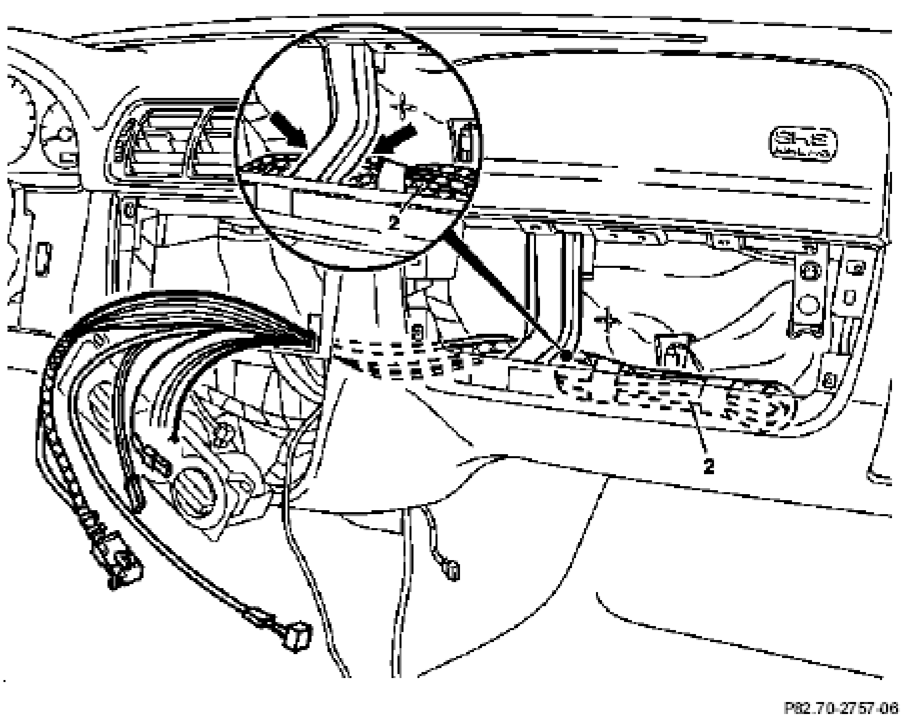


Fig. 329: Connecting STAR DIAGNOSIS For Read Out Fault Memory (Illustrated On Model 210)

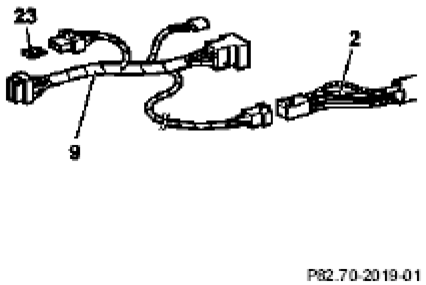


Fig. 330: Connecting STAR DIAGNOSIS For Read Out Fault Memory (Illustrated On Model 163)

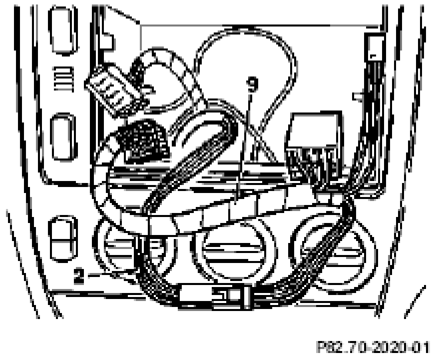


Fig. 331: Connecting STAR DIAGNOSIS For Read Out Fault Memory (Illustrated On Model 164.1)

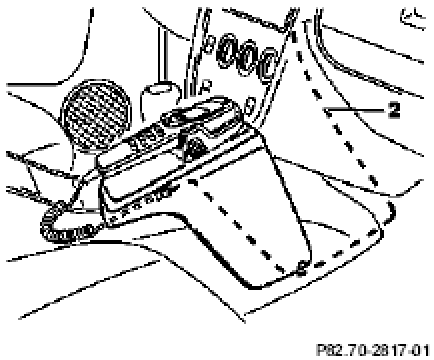


Fig. 332: Connecting STAR DIAGNOSIS For Read Out Fault Memory (Illustrated On Model 461.302)

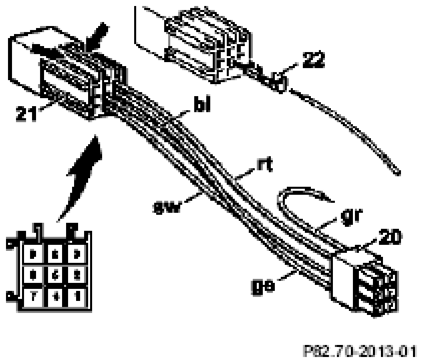


Fig. 333: Connecting STAR DIAGNOSIS For Read Out Fault Memory (Illustrated On Model 171.4)

1. Connect STAR DIAGNOSIS (0100) to diagnostic socket, on the data link connector (X11/4) or on the data link connector (1.3) (X11/22).
2. Switch on ignition.
3. Start the Diagnosis Assistance System.
4. In the "Model" menu, select the sub menu "Other model series".
5. Go through the instructions on the screen:
    - Enter the control unit version.
    - Read fault memory, erase.
    - Read actual values.
    - Perform actuations.
    - Adaptation of control units
6. Disconnect STAR DIAGNOSIS (0100).

i Stored faults which may be caused by disconnecting cables or by simulation during testing operations must be deleted in the diagnostic trouble code memory following completion of the operations.

EXPLANATION OF DIAGNOSTIC SYMBOLS - AD00.00-P-2001A

MODEL 124, 129, 140, 163, 168, 170, 201, 202, 208, 210, 215, 220

	Explanation of symbols for testers and components		**AD00.00-P-2000-01A**

DIAGNOSIS ASSIGNMENT - AD00.00-P-2002A

MODEL 124, 129, 140, 163, 168, 170, 201, 202, 208, 210

	Assignment of data link connector	Models 124.034/036, 129.063/067/076, 140, 170, 202, 208, 210	AD00.00-P-2000-02A
	Assignment of data link connector	Model 124 except 124.034/036, 129.060/061/066, 201	AD00.00-P-2000-02B
	Assignment of data link connector	Models 163, 168	**AD00.00-P-2000-02C**

CONNECT DIAGNOSIS TESTING EQUIPMENT - AD00.00-P-2003A

MODELS 124, 129, 140, 163, 168, 170, 201, 202, 203, 208, 209, 210, 220

MODELS 211.004 /006 /016 /026 /028 /042 /043 /061 /065 /070 /076 /206 /216 /226 /242 /261 /265 /616, 215.374

MODEL 230.474

	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Models 124.034/036, 129.063/067/076, 140, 170, 202, 208, 210	**AD00.00-P-2000-03A**
	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Model 124 except 124.034/036, 129.060/061/066, 201	AD00.00-P-2000-03B
	Connect hand-held tester (HHT), read out diagnostic trouble code memory	Model 163 up to 31.8.01, 168	**AD00.00-P-2000-03C**
	Connect STAR DIAGNOSIS and read out fault memory	Models 124.034/036, 129.058/063/067/076, 140, 163, 168, 170, 202, 203, 208, 209, 210, 211, 215.374, 220, 230	**AD00.00-P-2000-04A**

STAR DIAGNOSIS PROCEDURAL SCHEMATIC - AD00.00-P-2004-02A

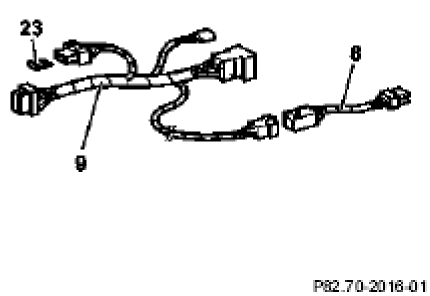


Fig. 334: Star Diagnosis Procedural Schematic

DIAGNOSTIC PROCEDURE - AD00.00-P-2004A

MODELS 124.034 /036, 129.058 /063 /067 /076, 140, 163 168, 170, 202, 203, 208, 210, 215, 220

	STAR DIAGNOSIS procedural schematic	**AD00.00-P-2004-02A**

TESTING & REPAIR

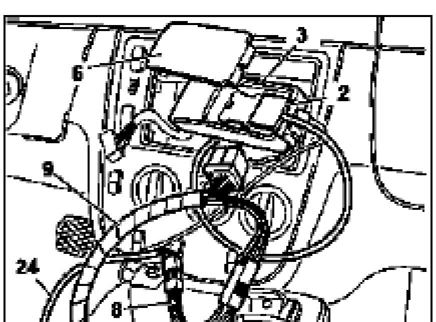
TESTING AND REPAIR WORK: PASSENGER CARS: OVERALL VEHICLE - AR00.00-Z-9163AA

MODEL 163

	Repair wiring harness as per specified repair method	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AR00.19-P-0001A**
	General repair methods for wiring harness.	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AR00.19-P-0100A**
	Removing contacts from plugs and connectors	MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463...	**AR00.19-P-0120A**
	Performing basic programming	MODEL 163	**AR00.19-P-0200GH**
	Raising, jacking up vehicle	MODEL 163	**AR00.60-P-1000GH**

REPAIR WIRING HARNESS AS PER SPECIFIED REPAIR METHOD - AR00.19-P-0001A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463



P82.70-2014-01

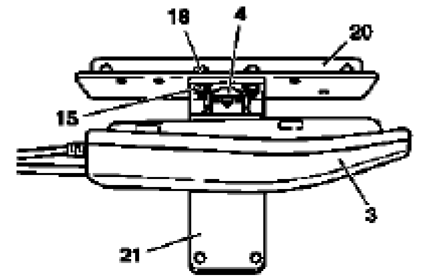
Fig. 335: Repair Wiring Harness As Per Specified Repair Method

Figure/item, etc.	**Work instructions**		
	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210,	**AH00.19-P-1000-08A**

		211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	
ⓘ	Assessment of damage in wiring harnesses	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463	**AH00.19-P-1000-05A**
ⓘ	Assessment of airbag and belt tensioner units in accident vehicles	Model 129, 202 up to 30.6.93 Model 124, 126, 140	AH91.00-P-0006-01A
i	Assessment of airbag and belt tensioner units in accident vehicles	Model 129 as of 1.7.93, 163, 164, 168, 169, 170, 171, 199, 202 as of 1.7.93, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463, 638, 901, 902, 903, 904, 905, 906, WD1, WD2, WD3, WD6, WD7, XD1, XD2, XD3, XD4, XD5, XD6, XD7, YD1, YD2, YD3, YD4, YD5, YD6, YD7	**AH91.00-P-0006-01B**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
i	Advantages of repairing wiring harnesses		**AH00.19-P-1000-03A**
i	Repair methods for wiring harnesses		**AH00.19-P-1000-04A**
i	Repair supplemental restraint system (SRS) squib wiring harness	Model 124, 129, 140, 163, 164, 168, 169, 170, 171, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463 Model 126 with code 291 Airbag for driver and front passenger (for front passenger only if driver airbag standard) Model 126 with code 442 Airbag in steering wheel	**AR54.18-P-0600A**
i	Repairing wiring harness	Model 168.031 ## up to 180747 with engine 166.940 Engine wiring harness at body side Model 168.033 ## up to	AR54.18-P-0100GF

		180747 with engine 166.960 Engine wiring harness at body side	
i	Repairing wiring harness	Model 168.007 with engine 668.941 Engine wiring harness at body side Model 168.008 with engine 668.940 Engine wiring harness at body side	AR54.18-P-0100GD
i	Repairing wiring harness	Model 168.007 with engine 668.941 Engine wiring harness Model 168.008 with engine 668.940 Engine wiring harness	AR54.18-P-0100GC
i	Install left front repair wiring harness	Model 168.007/008/031/032/033 Only vehicles with one-piece wiring harness	AR54.18-P-0700GC
i	Install right front repair wiring harness	Model 168.007/008/031/032/033 Only vehicles with one-piece wiring harness	AR54.18-P-0701GC
i	Install left rear repair wiring harness	Model 168.007/008/031/032/033 Only vehicles with one-piece wiring harness	AR54.18-P-0702GC
i	Install right rear repair wiring harness	Model 168.007/008/031/032/033 Only vehicles with one-piece wiring harness	AR54.18-P-0703GC
i	General repair method for wiring harness.		**AR00.19-P-0100A**
i	Checking wiring harness	Electrical connection set 126-pin socket box	**AR54.18-P-0600-01A** **Fig. 336** **Fig. 337**

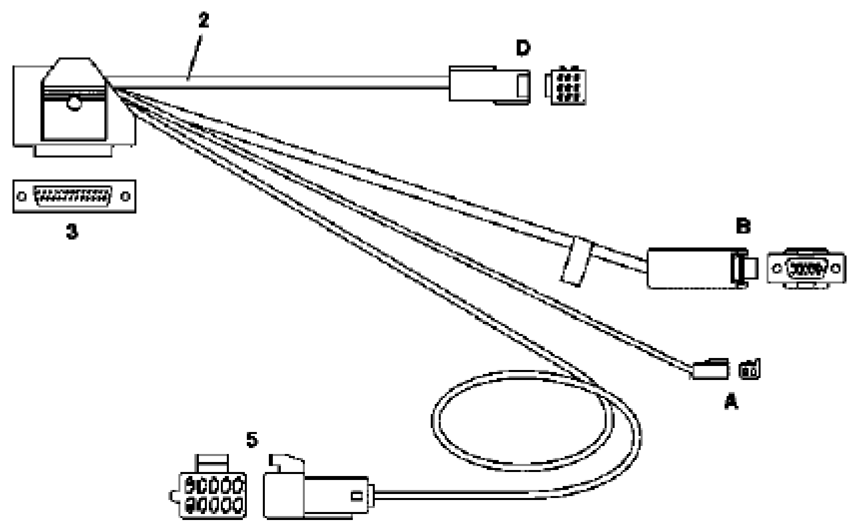
15	M4 nut (3 each)
18	M4 screw (3 each)



P82.70-2819-01

Fig. 336: Identifying Electrical Connection Kit (220 589 00 99 00)

3	FSE interface
5	Connection for microphone plug on seat
A	Loudspeaker connector
B	Portable cellular telephone mount connector
D	Adapter wiring harness connector



P82.70-4070-06

Fig. 337: Identifying 126-Pin Socket Box (129 589 00 21 00)

REPAIR WIRING HARNESS BY CRIMPING - AR00.19-P-0100-03A

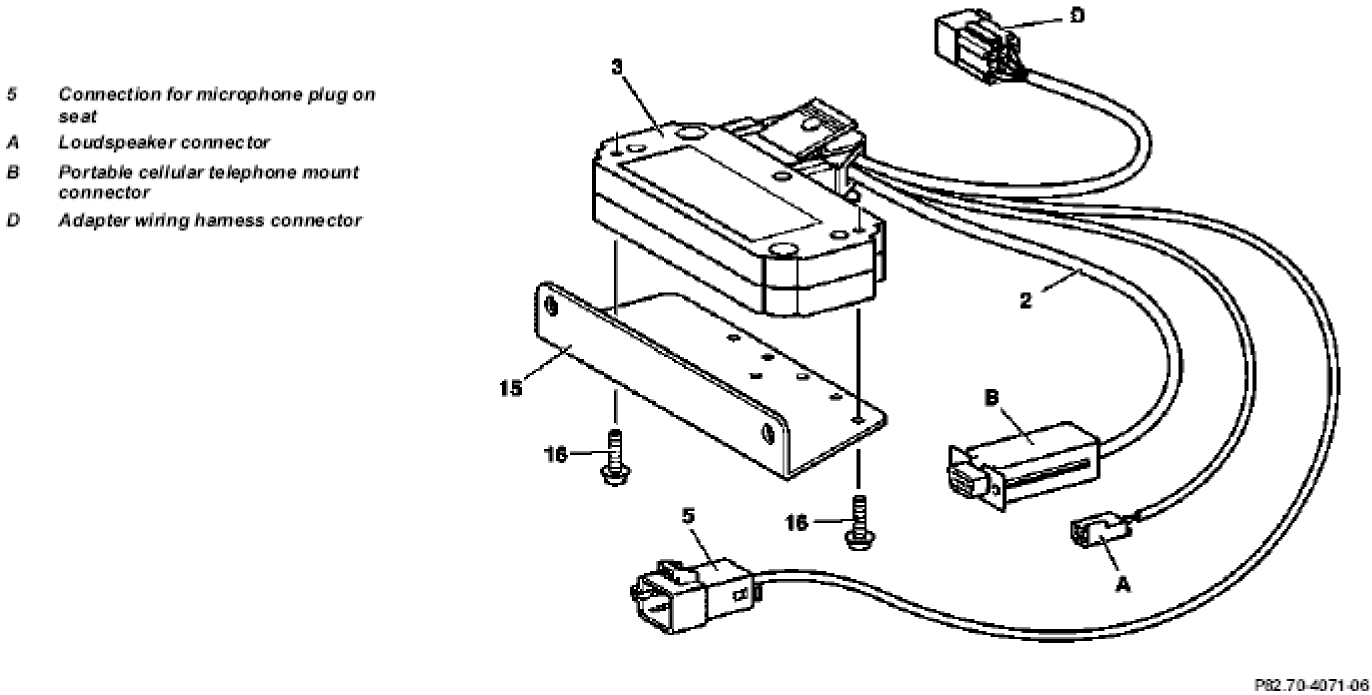


Fig. 338: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

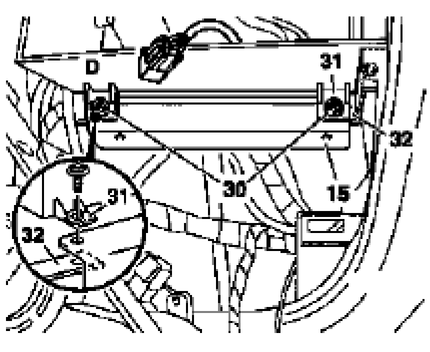


Fig. 339: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

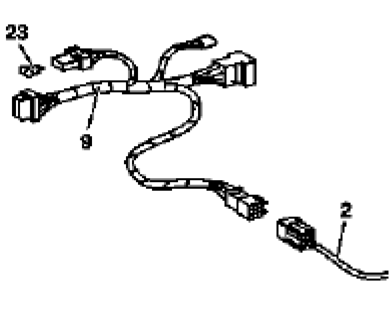


Fig. 340: Identifying Wiring Harness Repair Kit (000 589 02 99 00)

2	Portable cellular telephone wiring harness
D	Connector for adapter wiring harness

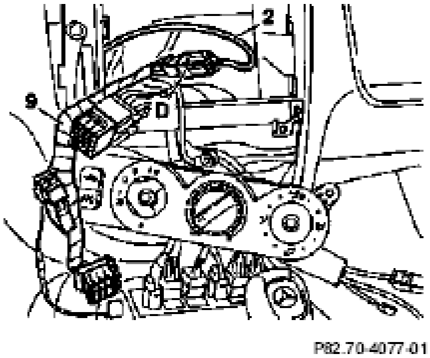


Fig. 341: Identifying Crimp Pliers (220 589 01 99 10)

A2/C	Adapter radio connector C
A28/3	GSM 1800 MHz compensator
A34/4	CTEL [TEL] interface
B	Portable cellular telephone mount connector
C	Microphone connector
D	Adapter wiring harness connector

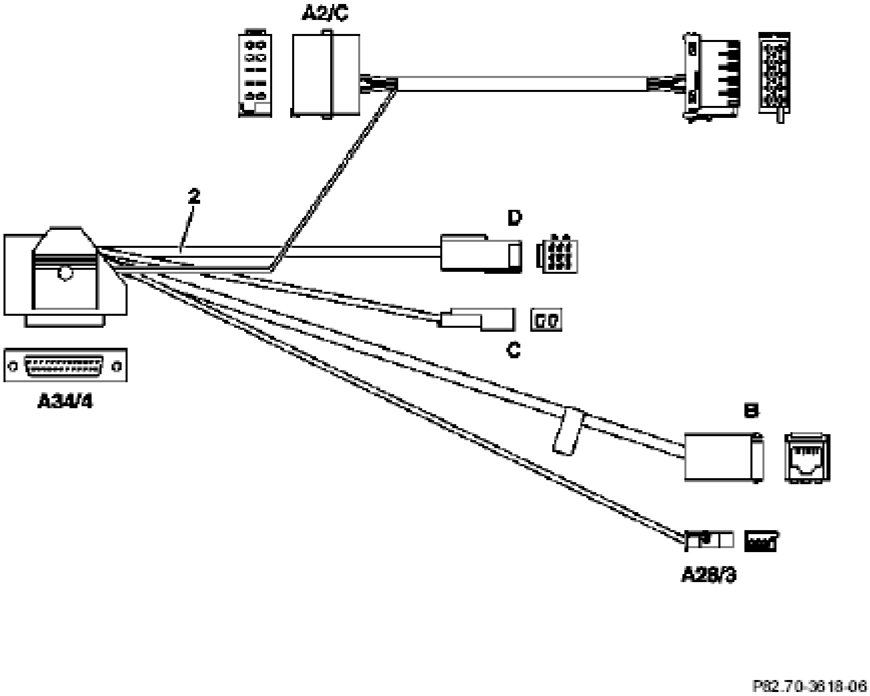


Fig. 342: Identifying Wire Stripper (220 589 01 99 01)

17	Antenna cable to portable CTEL
19	Antenna connection cable
B	Portable cellular telephone mount connector
C	Microphone connector
D	Adapter wiring harness connector

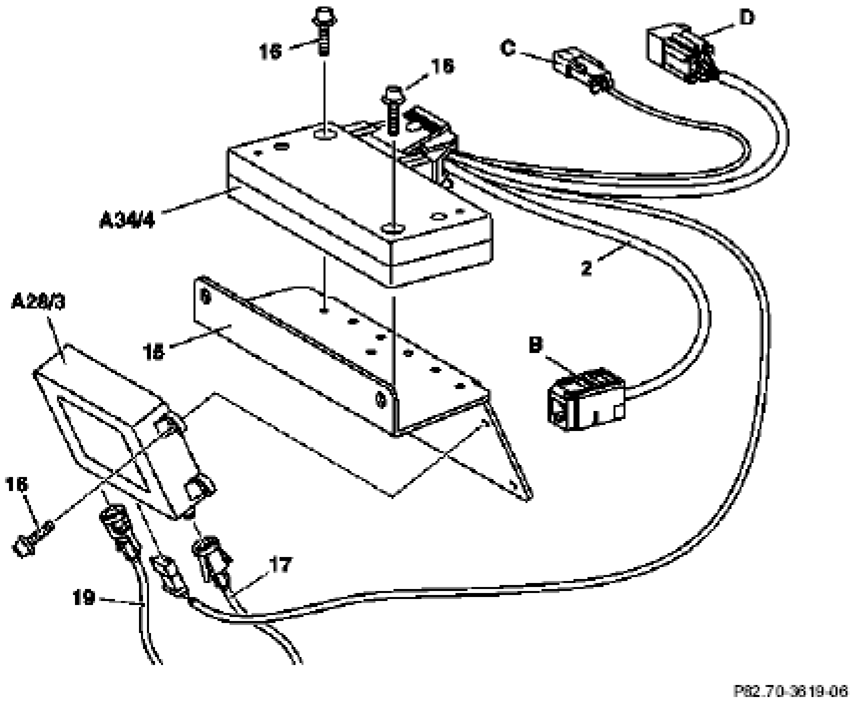


Fig. 343: Identifying FL. Crimping Kit 6.3/2.8 (220 589 01 99 83)

A28/3	E-net compensator

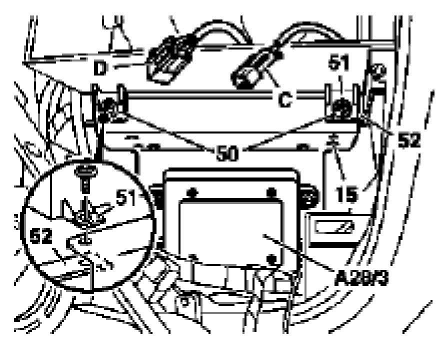


Fig. 344: Identifying MQS Crimping Set (220 589 01 99 85)

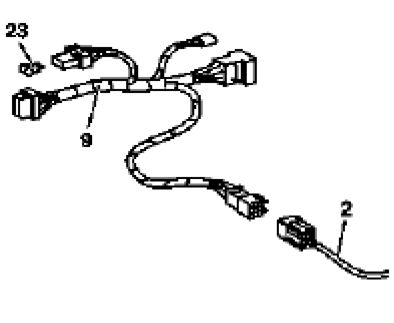


Fig. 345: Identifying MLK 1.2 Crimping Set (220 589 01 99 83)

A2 Radio
D Connector for adapter wiring harness

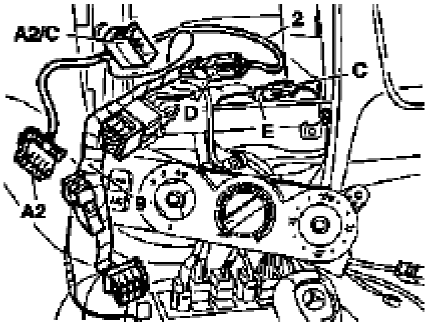


Fig. 346: Identifying MCP 2.8 Crimping Set (220 589 01 99 03)

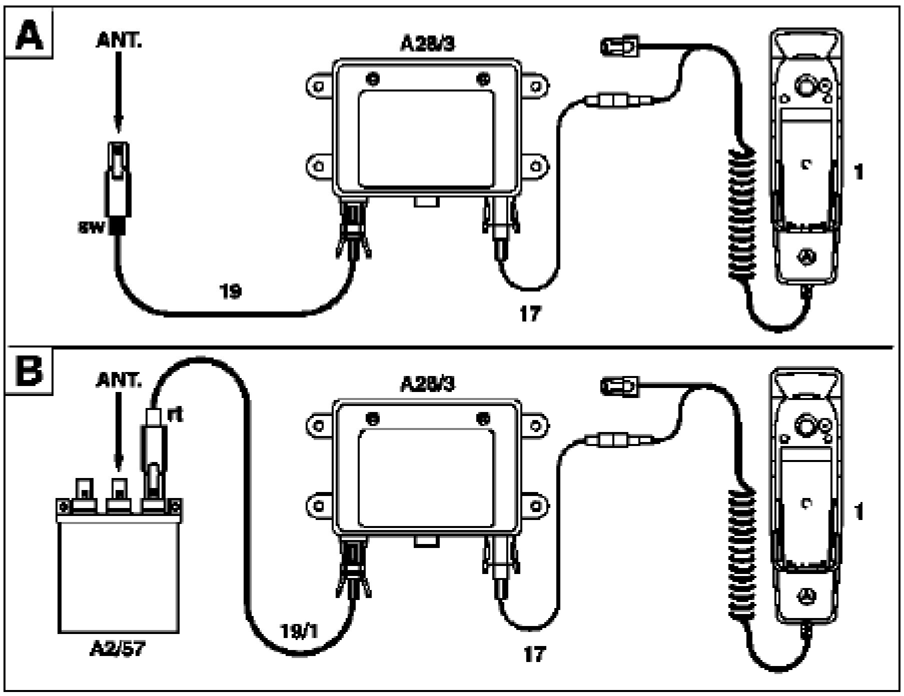
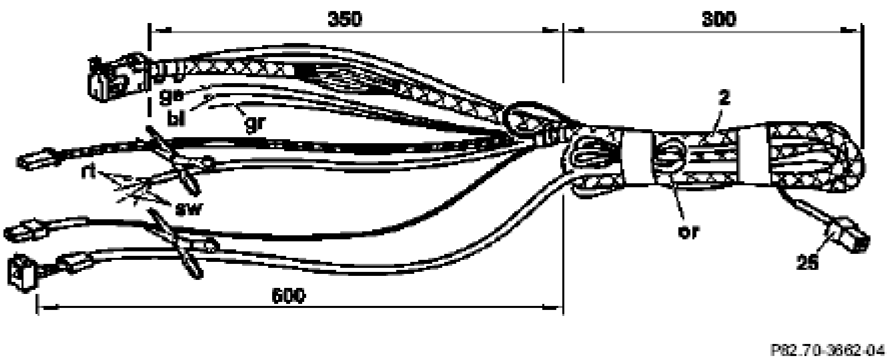


Fig. 347: Identifying MCP 2.8 Crimping Set (220 589 01 99 04)



bl	Blue lead (circuit 15)	or	Orange lead for automatic antenna (tie back, not required)
ge	Yellow lead (mute)	rt	Two red leads circuit 30)
gr	Gray lead (circuit 58d)	sw	Two black leads (circuit 31)

Fig. 348: Identifying JPT Crimping Set (220 589 01 99 05)

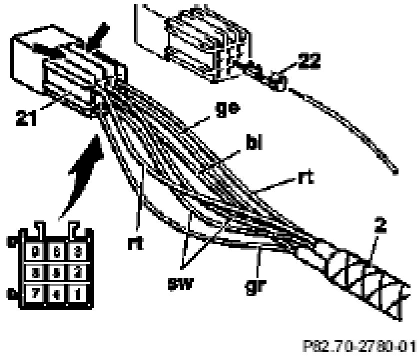


Fig. 349: Identifying RK 2.5 Crimping Set (220 589 01 99 06)

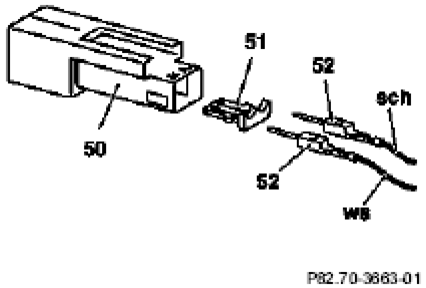


Fig. 350: Identifying SLK 2.8 Crimping Set (220 589 01 99 07)

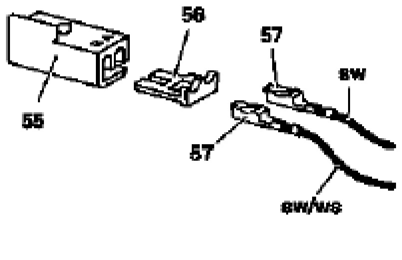


Fig. 351: Identifying MCP 1.2 Crimping Set (220 589 04 99 11)

Table of stripping lengths

Contact family	Single-strand insulation	Cable cross-section	Length stripped of insulation
All		up to 1.5 mm 2	4 mm 0.3
All		1.5 to 4 mm 2	5 + mm 0.3

1. Select crimp contact based on table in wiring harness repair kit, basic wiring harness repair kit or new passenger car wiring harness repair kit .
2. Strip cable in accordance with table using wire stripper .

   Damaged wire leads can cause changes of the line cross-section and result in an unreliable strength of the crimp connection.

   Shown with circular conductor

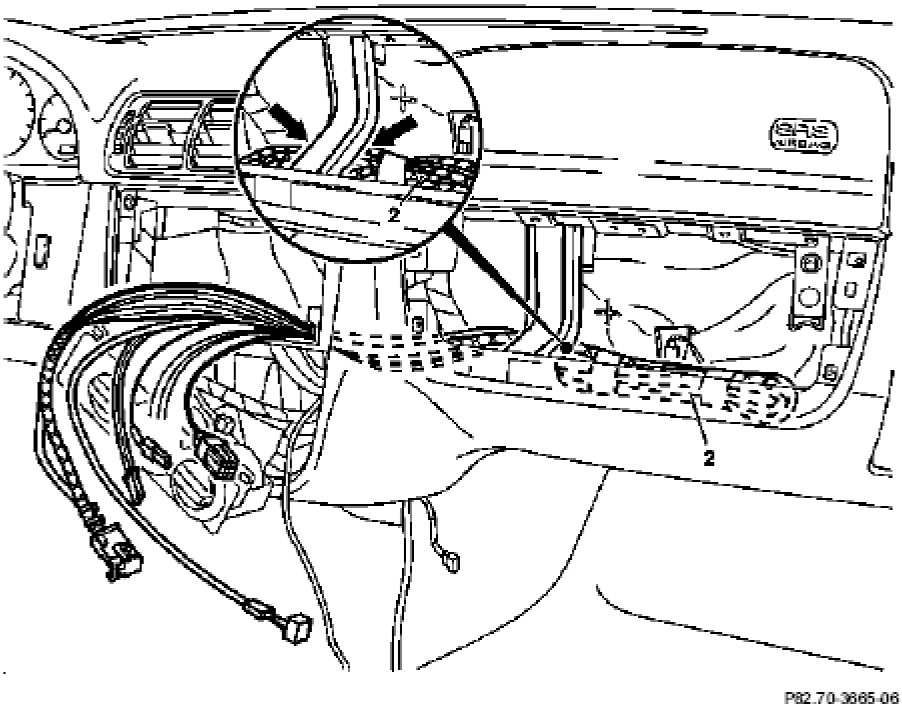


Fig. 352: Identifying Stripping Lengths - Shown With Circular Conductor

3. Select crimping kit (1, 2) for crimp pliers (3).

   Select crimping kit (1, 2) based on the crimp contact model used in the wiring harness repair kit , basic wiring harness repair kit or new passenger car wiring harness repair kit . See table.

4. Insert crimping kit(1, 2) into crimp pliers (3).

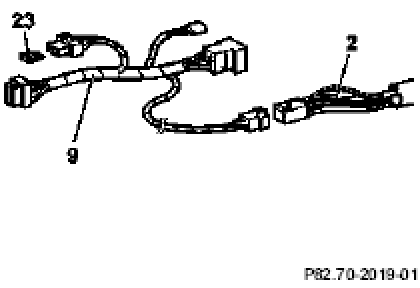


Fig. 353: Identifying Crimping Kit And Crimp Pliers

5.
   1. Screw positioner onto crimp pliers (arrow).
   2. Fit positioner with quick-release fitting on crimp pliers .

   Positioner with screw cap can be replaced with positioner with quick-release fitting.

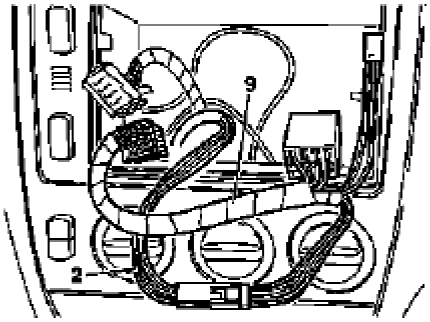


Fig. 354: Locating Screw Positioner Onto Crimp Pliers

6. Insert crimp contact (1) all the way into crimp nest (2) and into positioner (3) of die sets (4, 5).

   i Select crimp nest (2) according to cable cross section. Crimp contact (1) must be vertical between the die sets (4, 5).

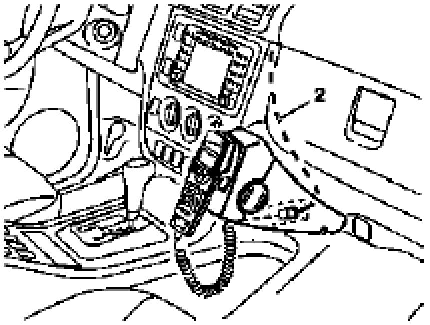


Fig. 355: Identifying Crimp Contact And Crimp Nest

7. Close crimp pliers until crimp contact (2) is fixed in crimp nest (3).

   i Ensure that the crimping contact (2) is correctly seated in the positioner (4).

   Do not deform the crimp contact (2) otherwise the cable (1) cannot be inserted correctly into the crimp contact (2).

8. Guide cable (1) into inserted crimp contact (2) (arrow).

   Shown with circular conductor

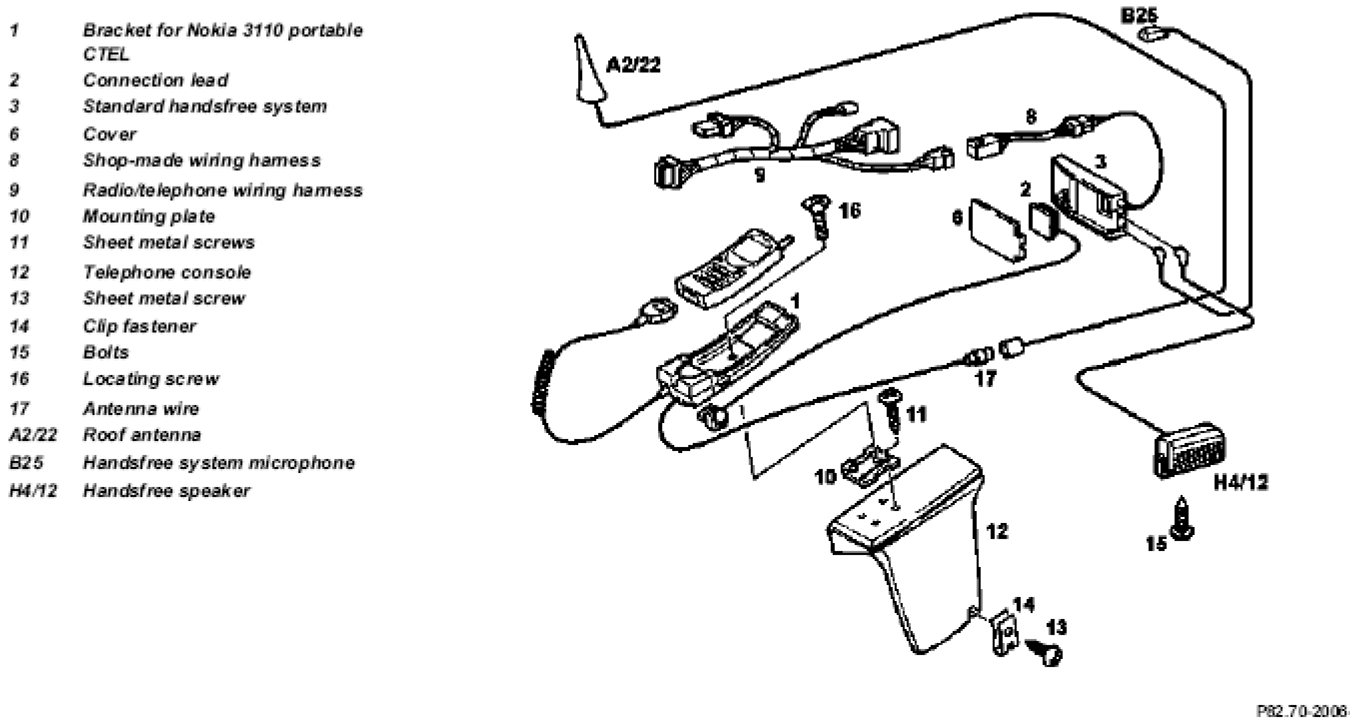


Fig. 356: Identifying Guide Cable, Crimp Contact And Crimp Nest - Shown With Circular Conductor

9. Squeeze crimp pliers until stop is reached remove crimped connection.

   The crimp pliers must be squeezed until stop is reached before they will open again.

Shown with circular conductor

1	Mount for portable cellular telphone	
2	Connectoin lead	
3	Standard hands-free system	
4	Installation base	
6	Cover	
8	Shop-made wiring harness	
9	Radio/telephone wiring harness	
10	Assembly plate	
11	Sheet metal screws	
12	Telephone console	
13	Sheet metal screw	
14	Clip fastener	
15	Nut	
16	Locating screw	
17	Antenna line	
18	Screw	
20	Hands-free unit holder	
21	Loudspeaker mount	
A2/22	Roof antenna	
B25	Hands-free system microphone	
H4/12	Hands-free system speaker	

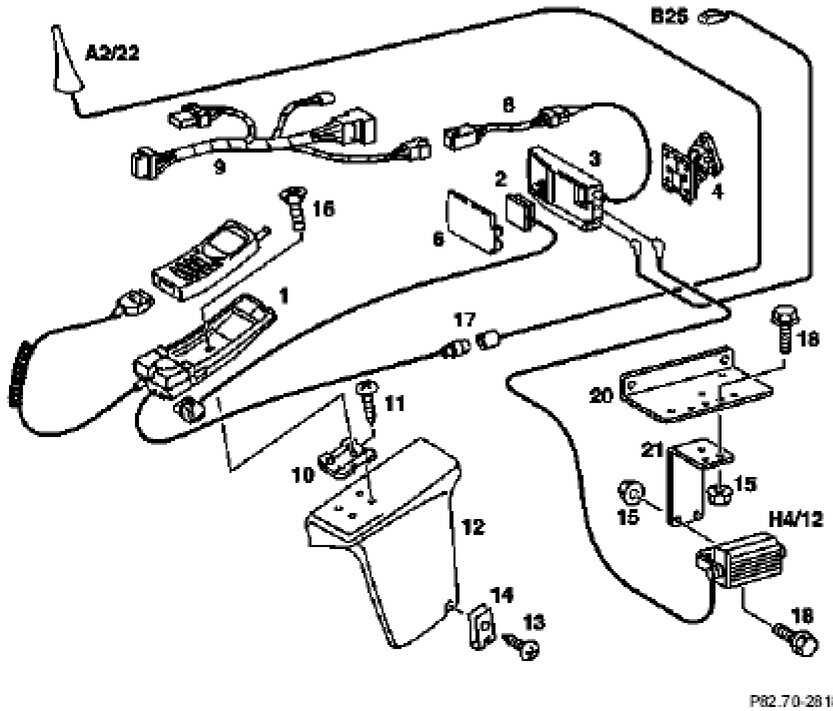


Fig. 357: Squeezing Crimp Pliers - Shown With Circular Conductor

REPAIR WIRING HARNESS BY CRIMPING (WITH WATERTIGHT CONNECTIONS) - AR00.19-P-0100-04A

1	Mount for portable cellular telphone
2	Portable cellular telephone wiring harness
3	FSE interface
5	Connection, microphone plug to seat
9	Radio/telephone wiring harness
10	Mounting plate
11	Sheet metal screws
12	Telephone console
13	Sheet metal screw
14	Mount for console
15	Mount for interface
16	Torx bolts
17	Antenna lead
A2/22	Roof antenna
B25	Hands-free system microphone
H4/12	Hands-free system loudspeaker

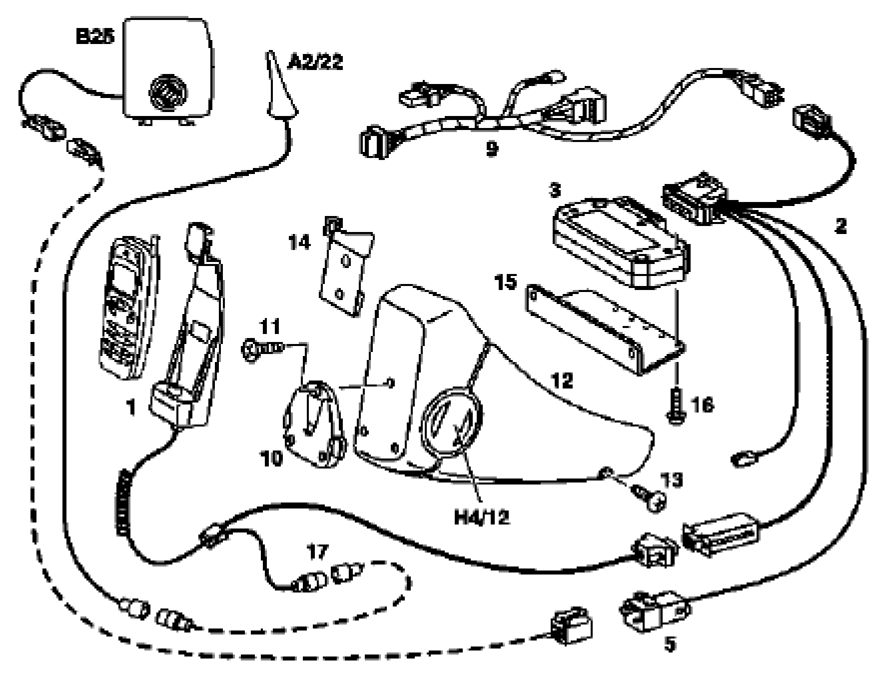


Fig. 358: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

1	Telephone handset mount
2	Telephone wiring harness
6	Cover
8	Telephone handset
9	Radio/telephone wiring harness
10	Mounting plate
11	Sheet metal screws
12	Telephone console
13	Sheet metal screw
14	Clip fastener
15	Bolts
16	Clip fastener nuts
17	Insert frame
18	DIN console
19	Antenna adapter
A2/22	Roof antenna
A35	Telephone, transmitter/receiver
B25	Handsfree system microphone
H4/12	Handsfree speaker

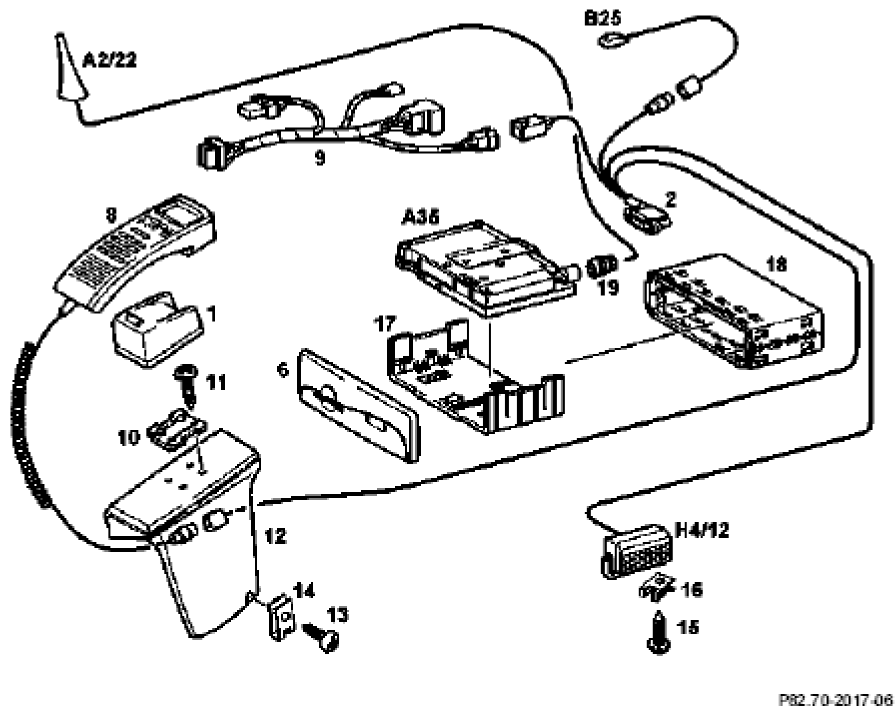


Fig. 359: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

1	Telephone handset mount
2	Telephone wiring harness
6	Cover
8	Telephone handset
9	Radio/telephone wiring harness
10	Mounting plate
11	Sheet metal screw
12	Telephone console
13	Sheet metal screw
14	Clip fastener
15	Nut
16	Screw
17	Insert frame
18	DIN/ISO installation frame
19	Antenna adapter
20	Bracket
21	Foam rubber sleeve
A2/22	Roof antenna
A35	Telephone, transmitter/receiver
B25	Handsfree system microphone
H4/12	Handsfree speaker

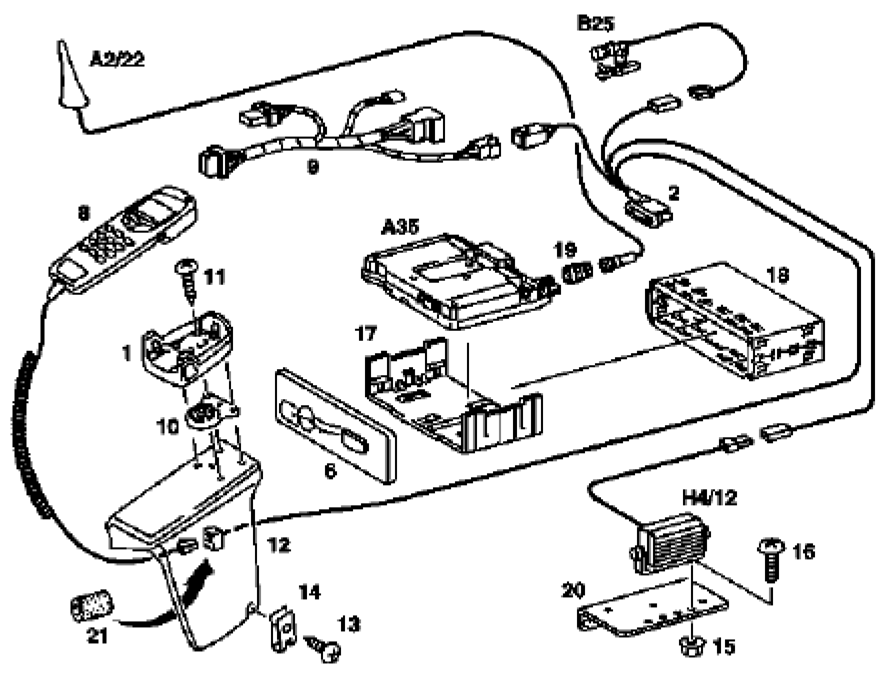


Fig. 360: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

2	Telephone wiring harness
6	Panel
8	Telephone set
9	Radio/telephone wiring harness
12	Telephone console
13	Plastic screw
14	Mount for console
17	Insert frame
18	DIN/ISO installation frame
19	Antenna adapter
20	Antenna adapter cable
21	Foam rubber grommet
A2/22	Roof antenna
A2/57	GPS and telephone antenna splitter (only on vehicles with Audio 30 APS)
A35	Telephone transmitter/receiver
B25	Hands-free system microphone
H4/12	Hands-free speaker

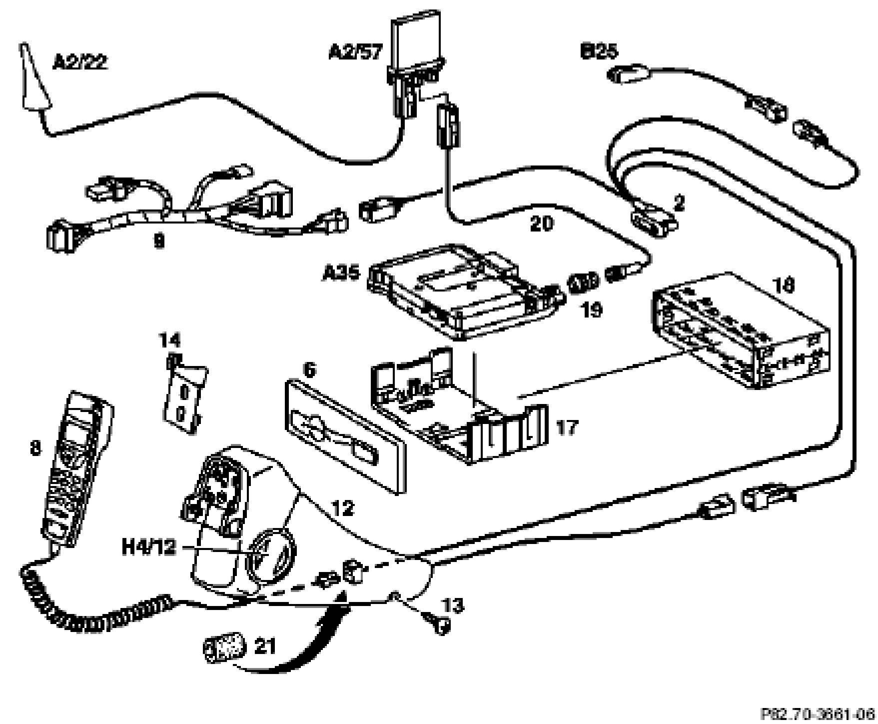


Fig. 361: Identifying Crimp Pliers (220 589 01 99 10)

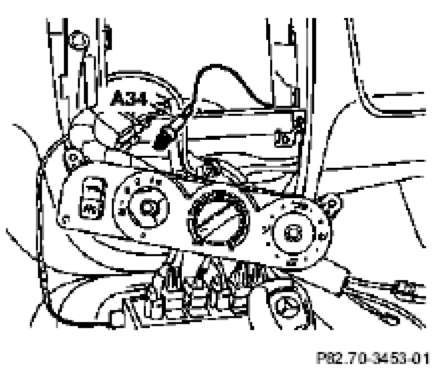


Fig. 362: Identifying Wire Stripper (220 589 01 99 40)

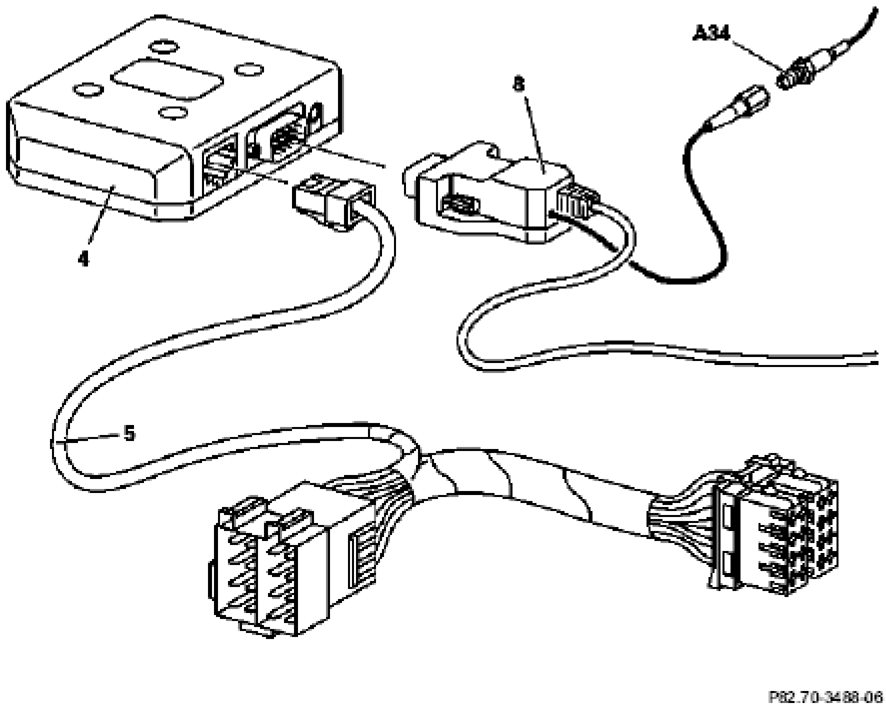


Fig. 363: Identifying MQS ELA Crimping Set (220 589 01 99 86)

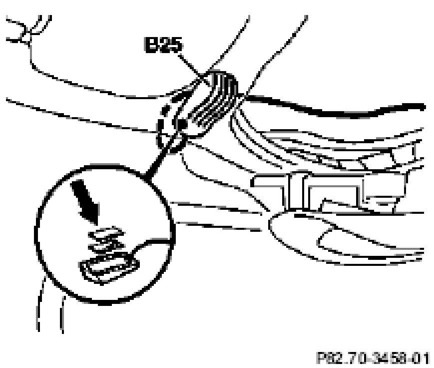


Fig. 364: Identifying SLK 2.8 / ELA Crimping Set (220 589 01 99 080)

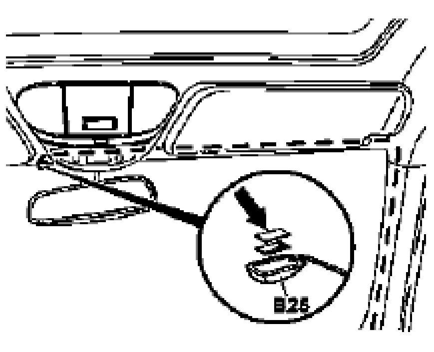


Fig. 365: Identifying SLK 2.8 ELA Crimping Set (220 589 01 99 09)

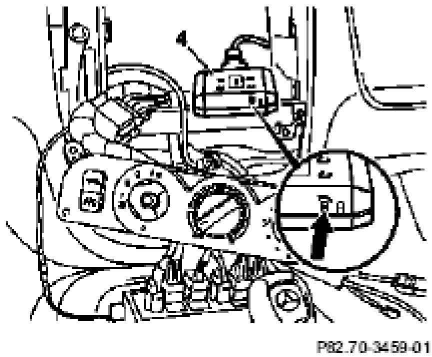


Fig. 366: Identifying MCP 2.8 ELA Crimping Set (220 589 01 99 80)

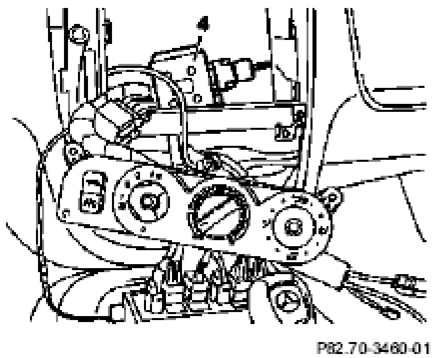


Fig. 367: Identifying MCP 2.8 ELA Crimping Set (220 589 01 99 81)

1	Portable cellular telephone mount (for special portable cellular telephone)
2	Base bracket
3	Sheet metal screws (3 each)
4	Interface box
5	Connection lead (not VDA)
12	Console
13	Screw
15	Mount
B25	Hands-free system microphone

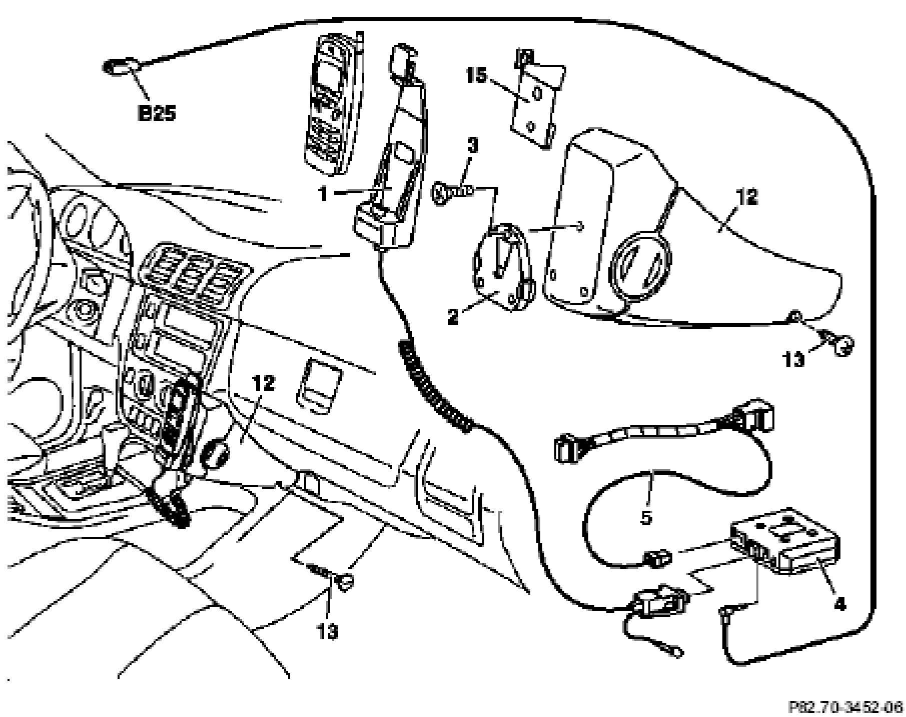


Fig. 368: Identifying JPT ELA Crimping Set (220 589 01 99 82)

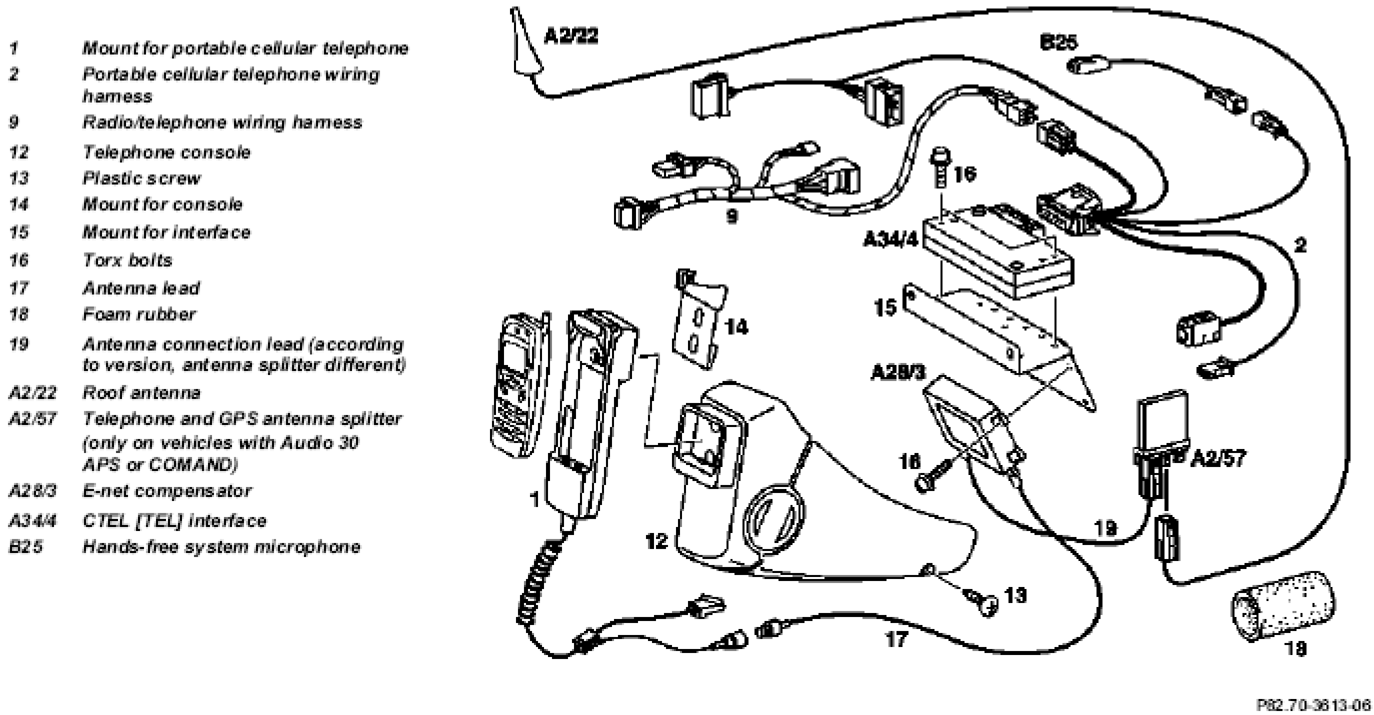


Fig. 369: Identifying MLK 1.2 ELA Crimping Set (220 589 01 99 84)

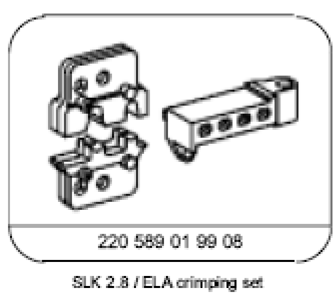
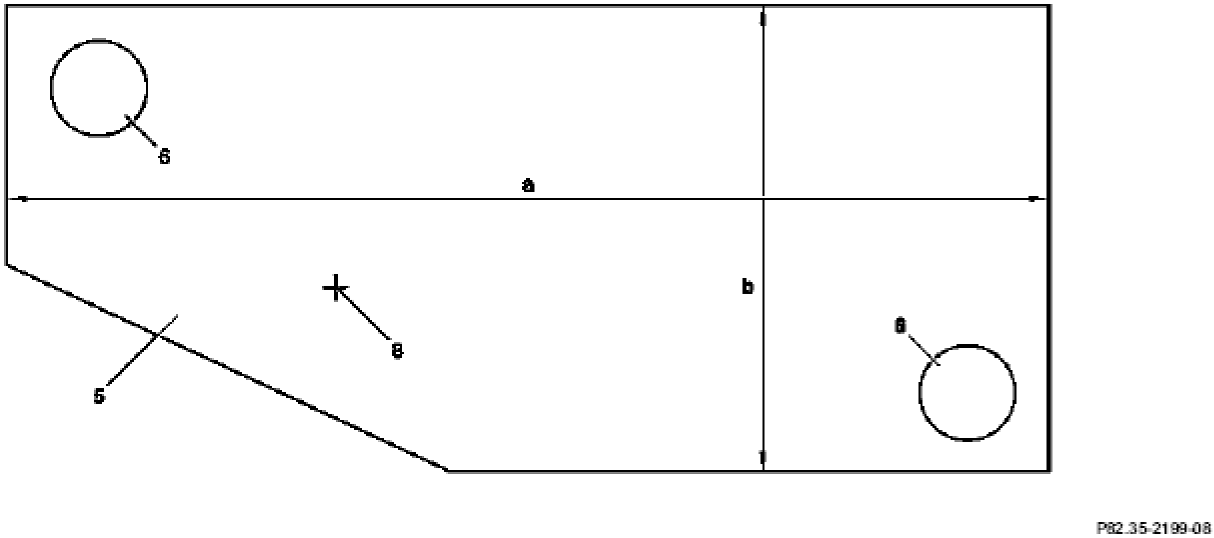


Fig. 370: Identifying SLK 2.8 / ELA Crimping Set (220 589 01 99 08)



5	Template	8	Bore	a	200 mm
6	Holes			b	90 mm

Fig. 371: Identifying MCP 2.8 ELA Crimping Set (000 589 13 99 10)

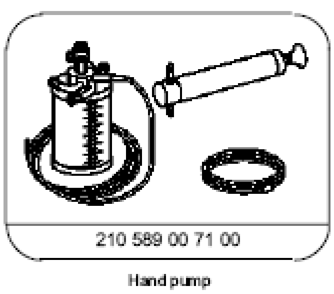


Fig. 372: Identifying MCP 1.2 ELA Crimping Set (220 589 04 99 10)

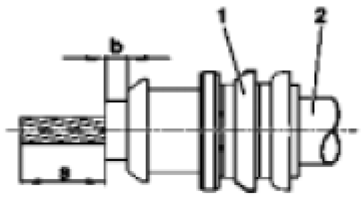
Table of stripping lengths

Contact family	Single-strand sealing	Cable cross-section	Length stripped of insulation
All		up to 1.5 mm 2	4 mm ± 0.3
All		1.5 up to 4 mm 2	5 mm ± 0.3

1. Select crimp contact according to assignment table in wiring harness repair kit, wiring harness repair kit basic or wiring harness repair kit as supplement to passenger cars .
2. Push single-strand insulation (1) over cable (2) with lip at the front.
3. Strip line (2) using wire stripper according to assignment table.

   Damaged wire strands can lead to changes in the line cross-section and an impermissible strength of the crimped connection.

4. Align single-strand insulation (1) with line (2) ensuring that dimension (b) = maximum 1 mm.



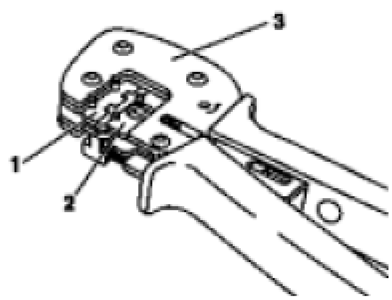
P54.18-2171-01

Fig. 373: Aligning Single-Strand Insulation With Line

5. Select crimping set (1, 2) for crimp pliers (3) .

   Select crimping set(1, 2) according to the crimp contact type and single-strand insulation used. See table.

6. Insert crimping set (1, 2) into crimp pliers (3) .

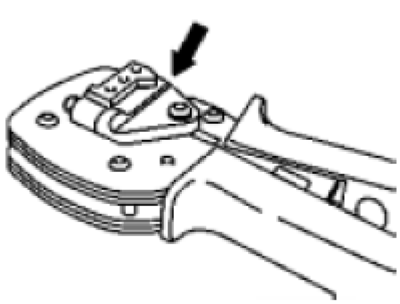


P54.18-2070-01

Fig. 374: Identifying Crimping Kit And Crimp Pliers

7.
   1. Screw positioner onto crimp pliers (arrow).
   2. Fit positioner with quick-release fitting on crimp pliers .

   Positioners with screw fitting can be exchanged for positioners with quick-release fitting.



P54.18-2610-01

Fig. 375: Locating Screw Positioner Onto Crimp Pliers

8. Insert crimp contact (1) all the way into crimp nest (2) and into positioner (3) of die sets (4, 5).

   ⓘ Select crimp nest (2) according to cable cross section. Crimp contact (1) must be vertical between the die sets (4, 5).

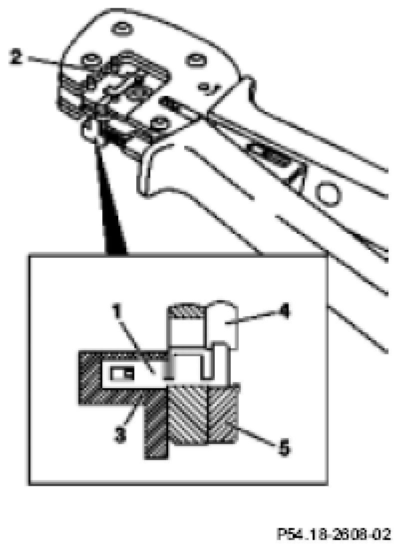


Fig. 376: Identifying Crimp Contact

9. Close crimp pliers until crimp contact (2) is fixed in crimp nest (3).

   ⓘ Make sure that the crimp contact (2) is inserted correctly in the positioner (5).

   Do not yet deform the crimp contact (2), as otherwise the line (1) cannot be inserted correctly into the crimp contact (2).

10. Guide cable (1) with single-strand insulation (4) into inserted crimp contact (2) (arrow).

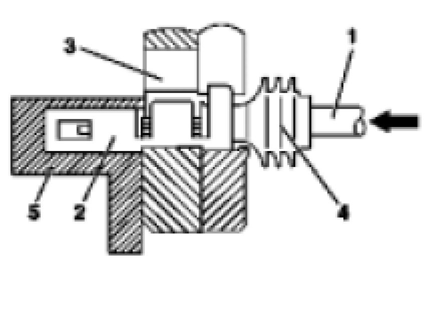


Fig. 377: Identifying Guide Cable And Crimp Contact

11. Squeeze crimp pliers until stop is reached remove crimped connection.

i The crimp pliers must be squeezed until stop is reached before they will open again.

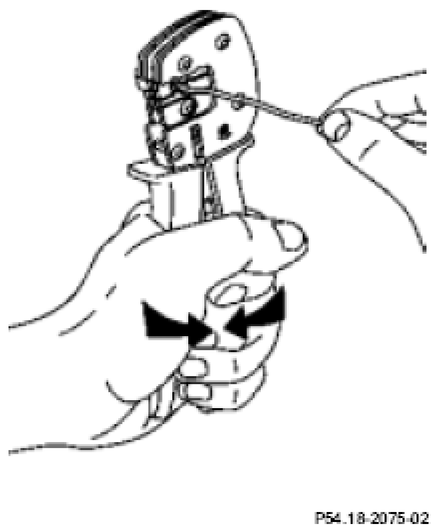


Fig. 378: Squeezing Crimp Pliers

12. Check crimped connection for deformation and ensure that the wires fill the crimp tab correctly (cross-section of enclosed wires).

i **Correct crimped connection (A):**

The strands of the cable are evenly enclosed. The crimp tab is evenly shaped.

i **Incorrect crimped connections (B, C, D)**

The crimp shackle has the wrong cross-section. The crimp tab is not filled properly. Individual wire strands are outside the crimp shackle. The crimp tab is too full. The crimp claws touch the bottom of the crimped fitting. The crimp tab is too full. The crimp tab is deformed incorrectly and therefore damaged.

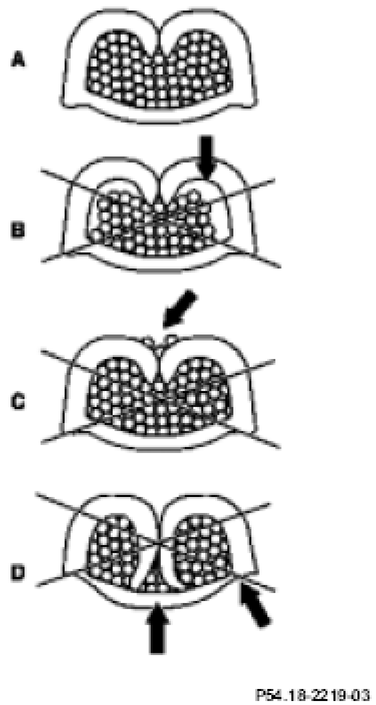


Fig. 379: Cross-Section Of Enclosed Wires - Correct And Incorrect

13. Check crimped connection to ensure that all wires are enclosed correctly.

 Insulation and single-strand insulation must be positioned in the center and enclosed completely by the crimp tab and they must be able to take up tensile force.

 Single-strand insulation must not be pinched otherwise galvanic corrosion can occur if the connection is penetrated by water.

 Correct crimped connection (A):

Wire strands are enclosed correctly by the shackle. Insulation and single-strand insulation are enclosed correctly by the large tab. All parts can withstand the required tensile force.

 Incorrect crimped connections (B, C):

The single-strand insulation is not enclosed by the shackle because it was inserted incorrectly during the crimping procedure.

The crimped area of the single-strand insulation is damaged because the wrong die set or wrong single-strand insulation was used.

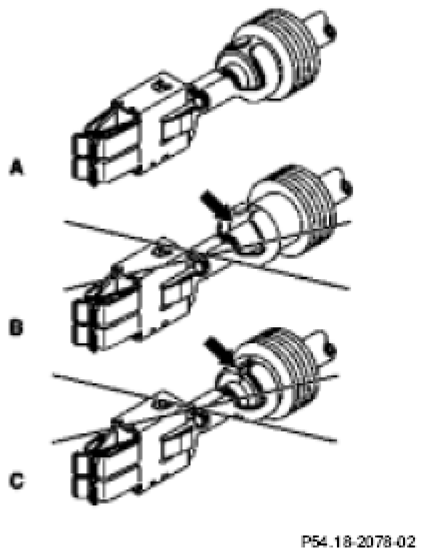


Fig. 380: Identifying Crimp Connections - Correct And Incorrect (1 Of 2)

14. Check crimped connection for correct length and distance of strands and insulation, as well as position and condition of seal.

    i **Correct crimped connection (A):**

    Insulation and wires are of the correct length in the shackles. Correct distance between the single-strand insulation and the end of the insulation.

    i **Incorrect crimped connections (B, C):**

    The single-strand insulation is damaged because the distance between seal and end of insulation is too small.

    Stripped strands are too long, single-strand insulation is therefore not crimped.

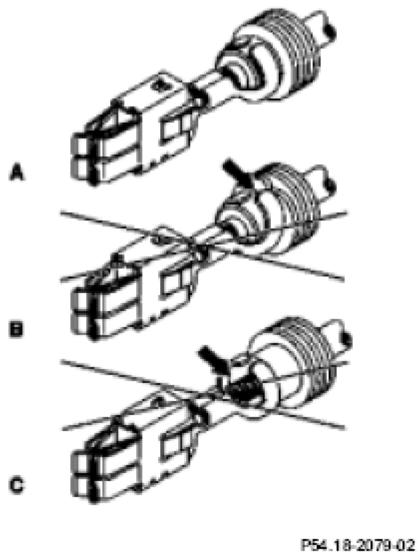


Fig. 381: Identifying Crimp Connections - Correct And Incorrect (2 Of 2)

REPAIRING CABLE HARNESS BY SOLDERING - AR00.19-P-0100-05A

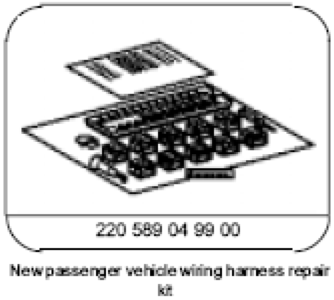


Fig. 382: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

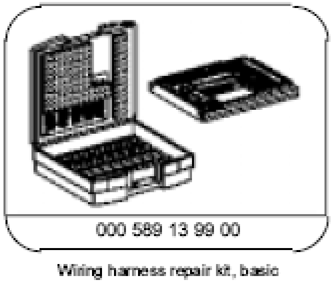


Fig. 383: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

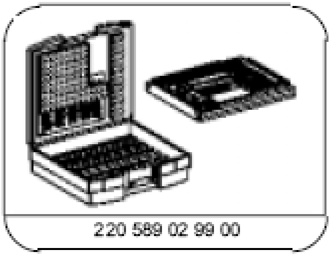


Fig. 384: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

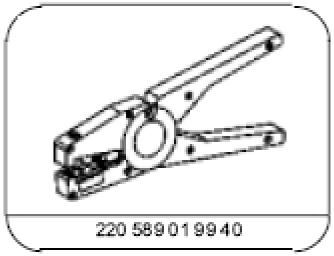


Fig. 385: Identifying Wire Stripper (220 589 01 99 40)

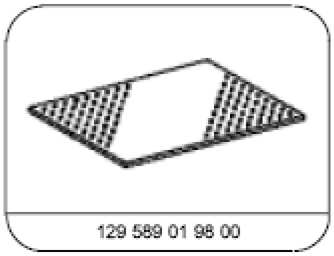


Fig. 386: Identifying Welding Bead Catcher (129 589 01 98 00)

1. Strip line (2)using wire stripper  .

    Do not damage the wire strands.

   Do not bend or twist the wire strands.

2. Fill solder connection (1) in soldering area with soldering paste.

A Radial version
B Axial version

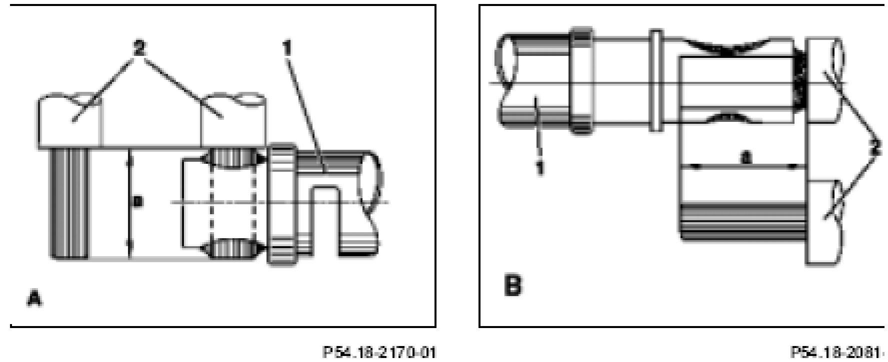


Fig. 387: Repairing Cable Harness By Soldering (1 Of 2)

3. Insert cable (1) into solder connection (2).
4. Introduce solder (3) into solder connector (2) and make solder connection as per the drawings opposite.
5. Clean residues from soldering join and contact.

A Radial version
B Axial version

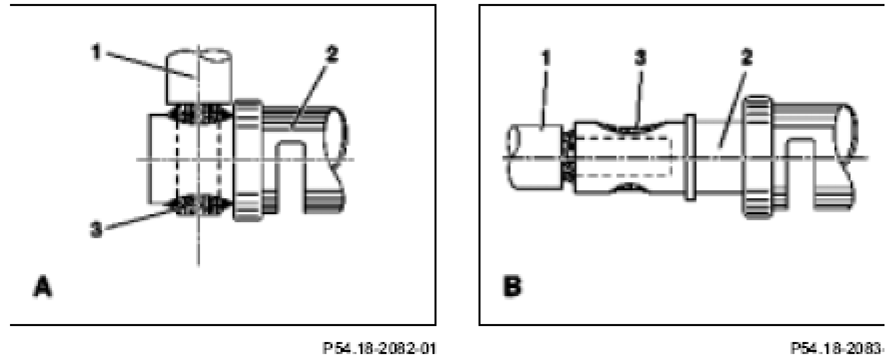


Fig. 388: Repairing Cable Harness By Soldering (2 Of 2)

REPAIR WIRING HARNESSES USING RAPID CONNECTION TECHNOLOGY - AR00.19-P-0100-06A

i The cable connectors must only be used inside the vehicle. Cable connectors must only be used once.

Use only 2-, 4-, 6- and 10-terminal cable connectors released by DaimlerChrysler.

The approved cable connectors must only be used for a cable cross section of 0.35 to 0.75 mm^2 .

They are not approved for CAN lines.

1. Select cable connectors according to the cable cross-sections and the number of cables.
2. Insert the cables individually into the notches one by one (arrows).

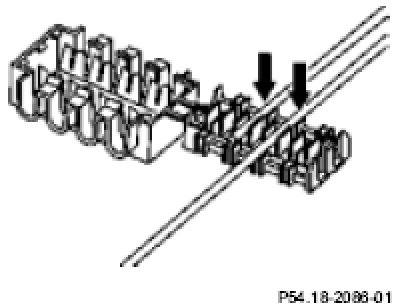


Fig. 389: Locating Cables

At the ends of cables, ensure that the wire is positioned such that distance (a) between the end of the wire and the edge of the housing is approx. 2 mm (arrow). Make sure that this distance is not too long or too short.

Only this ensures that the line is clamped twice and that the distance to the edge of the housing is large enough to prevent a short circuit.

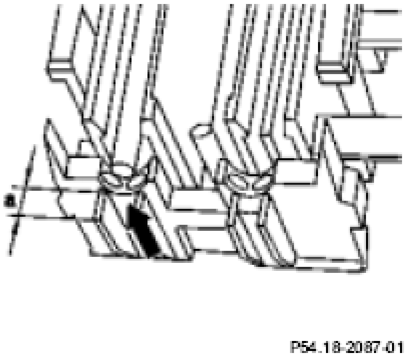


Fig. 390: Locating Distance Between End Of Wire And Edge Of Housing

3. Press together the cable connector by pressing the top and bottom part at the same time using pliers until you hear it snap into place.

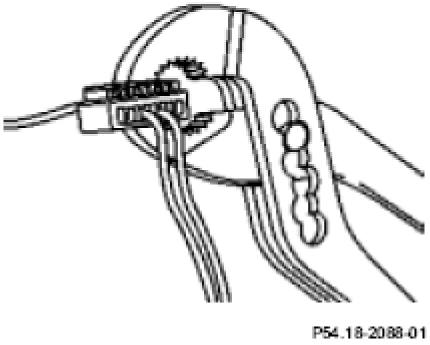


Fig. 391: Pressing Cable Connector

4. Check that cable connector has snapped into place all the way round.

    Secure cable connectors in vehicle to prevent them rattling.

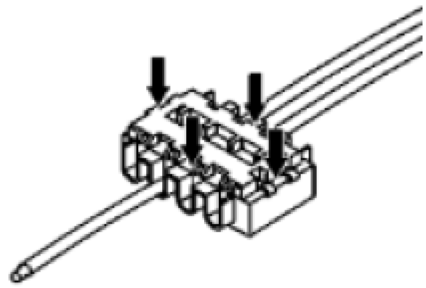


Fig. 392: Locating Cable Connectors

PROTECT REPAIR AREA AFTER CABLE REPAIRS - AR00.19-P-0100-08A

Protection of repair area with heat-shrinkable tube

1. Slide heat-shrinkable tube over the repair area.
2. Heat the heat-shrinkable tube using hot air blower until it lies evenly against the repair area.

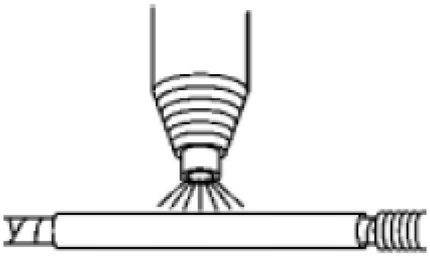


Fig. 393: Heating Heat-Shrinkable Tube

PROTECT REPAIR AREA AFTER CABLE REPAIRS - AR00.19-P-0100-08B

Protect repair area using corrugated hose.

1. Place corrugated hose over repair area.
2. Wrap insulating tape around corrugated hose at both ends.

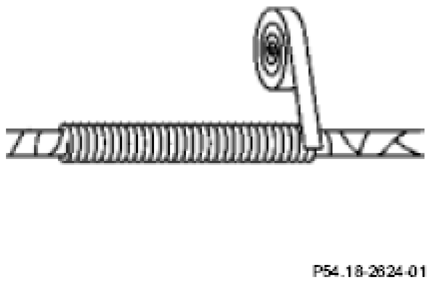


Fig. 394: Wrapping Insulating Tape Around Corrugated Hose At Both Ends

PROTECT REPAIR AREA AFTER CABLE REPAIRS - AR00.19-P-0100-08C

Protect repair area by wrapping fabric tape around it.

1. Wrap fabric tape around repair area as per original condition.

   i Fabric tape restores the appearance of the repair area and provides protection from chafing. In parts of vehicle subject to high levels of stress (e.g. engine compartment) fabric tape should only be used together with other (watertight) protective measures.

REPAIRING WIRING HARNESS USING SOLDER CONNECTORS - AR00.19-P-0100-09A

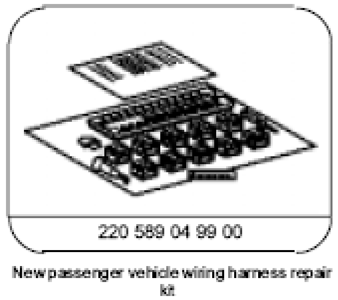


Fig. 395: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

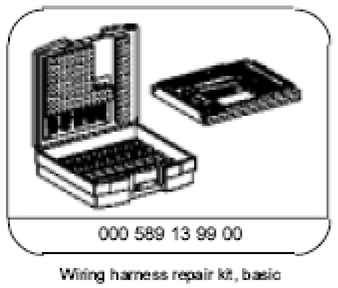
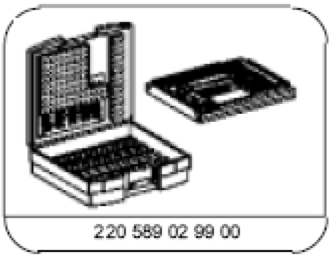
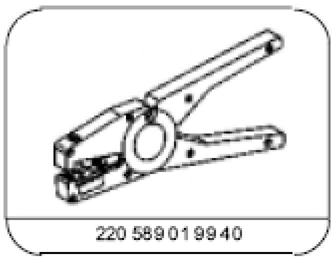


Fig. 396: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



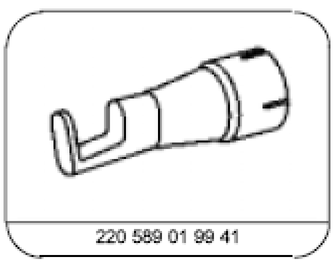
Wiring harness repair kit

Fig. 397: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



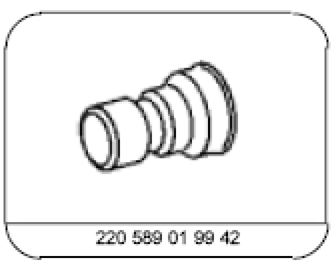
Wire stripper

Fig. 398: Identifying Wire Stripper (220 589 01 99 40)



Reflector

Fig. 399: Identifying Reflector (220 589 01 99 41)



Adapter

Fig. 400: Identifying Adapter (220 589 01 99 42)

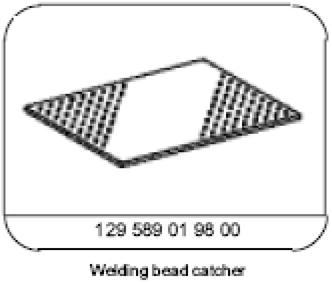


Fig. 401: Identifying Welding Bead Catcher (129 589 01 98 00)

Workshop equipment/MB testers

WE58.40-Z-1007-03A	Hot-air gun

1. Expose damaged cable or plug/coupling in easily accessible position and cut off.

   i Separate cores in wiring harness offset by approx. 45 mm (B).

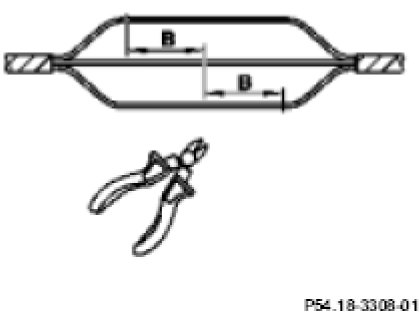
   

   Fig. 402: Identifying Wiring Harness Offset Distance

2. Cut new section of cable to match old cable.

   i When cutting the line, add an allowance of approx. 50 mm (C) for loop formation (strain-relief).

3. Remove approx. 15 mm (D) of insulation at line ends.
4. Select solder cup as shown in table below.

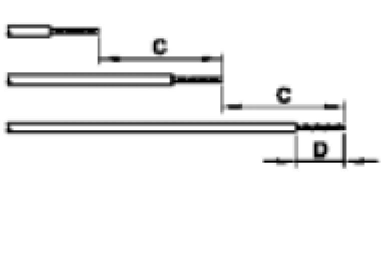
   

   Fig. 403: Identifying Dimensions For Cutting Line

Selection table for solder connector			
Total copper cross-section $A_{tot.}$	Overall diameter with insulation	Length stripped of insulation	Color code
0.7 to 2.4 mm^2	3.3 mm	15 mm	green
2.0 to 4.0 mm^2	4.5 mm	15 mm	red
3.5 to 8.0 mm^2	7.0 mm	15 mm	blue
7.5 to 12 mm^2	9.0 mm	15 mm	Yellow

i A maximum of seven individual cables maybe inserted into each solder connection.

5. Insert the cables into the corresponding solder connections (Z) according to the total cable cross-section.
6. Ensure that solder connection (Z) is fully rotated onto cables.

i Approx. 5 mm (A) of the stripped line ends should be visible.

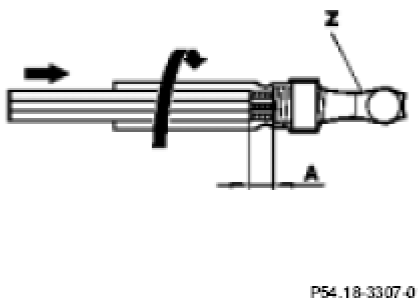


Fig. 404: Rotating Solder Connection Onto Cables

7. Heat solder connector using a heat gun (approx. 400°C).

i Start at tapered end until soldering ring has dissolved and sleeve has correctly wrapped itself around the line.

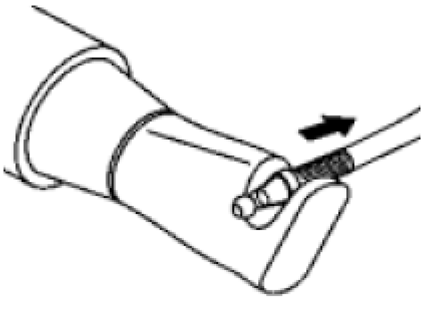
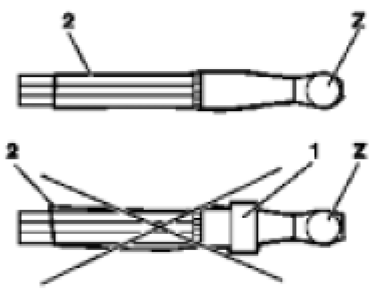


Fig. 405: Heating Solder Connector Using Heat Gun

8. Check soldered point.

   i The soldering ring (1) of the solder connection (Z)must no longer be visible. The covering (2) must be resting smoothly against the cables.

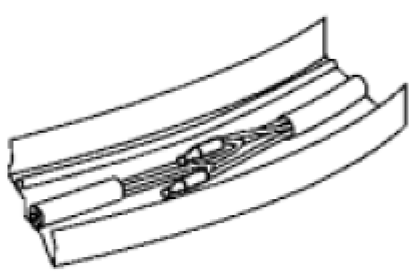


P00.19-3290-01

Fig. 406: Identifying Solder Connection - Correct/Incorrect

9. Fit solder connection onto cable and wrap fabric tape around repaired area.

   i Solder connections must not be positioned directly one above the other.



P54.18-2031-01

Fig. 407: Identifying Solder Connection

GENERAL REPAIR METHODS FOR WIRING HARNESS. - AR00.19-P-0100A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Figure/item, etc.	Work instructions		
⚠ Danger!	**Risk of injury** to skin and eyes caused by handling hot or glowing objects.	Wear safety gloves, protective clothing and safety glasses, if necessary.	**AS00.00-Z-0002-01A**
⚠ Danger!	**Risk of injury** caused by burns to skin and eyes.	Work in well ventilated rooms only. Wear safety	**AS00.19-Z-0001-01A**

	Risk of poisoning caused by inhaling fumes when working with heat-shrinkable tubing.	glasses with side protection and protective gloves.	
⚠ Danger!	**Risk of injury** caused by burns to skin and eyes, **risk of poisoning** caused by inhaling fumes during soldering.	Wear protective gloves, protective clothing and safety glasses. Ensure that the work area is adequately ventilated. Secure power supply cables. Avoid sources of fire in working area.	**AS00.19-Z-0002-01A**
	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
	Assessment of damage in wiring harnesses		**AH00.19-P-1000-05A**
	Notes on crimping		**AH00.19-P-1000-09A**
	Notes on soldering		**AH00.19-P-1000-10A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
i	Advantages of repairing wiring harnesses		**AH00.19-P-1000-03A**
i	Repair methods for wiring harnesses		**AH00.19-P-1000-04A**
i	Notes on soft soldering		**AH00.19-P-1000-07A**
i	Notes on cable protection		**AH00.19-P-1000-11A**
i	Removing contacts from plugs and connectors		**AR00.19-P-0120A**
i	Repairing wiring harness using solder connectors		**AR00.19-P-0100-09A**
i	Repair wiring harness by crimping		**AR00.19-P-0100-03A**
i	Repair flat conductor wiring harness by crimping	Model 164, 211, 216, 219, 221, 251	AR00.19-P-0100-10A
i	Repair wiring harness by crimping (with watertight connections)		**AR00.19-P-0100-04A**
i	Repairing cable harness		**AR00.19-P-0100-05A**

	by soldering		
i	Repair cable harness using rapid connection technology		AR00.19-P-0100-06A
i	Protect repair area after cable repairs	Heat-shrinkable tube	AR00.19-P-0100-08A
i	Protect repair area after cable repairs	Corrugated tube	AR00.19-P-0100-08B
i	Protect repair area after cable repairs	Fabric tape	AR00.19-P-0100-08C
i	Checking wiring harness		AR54.18-P-0600-01A
GF	Plugs and couplings as-built configuration		GF00.19-P-8000A
GF	Female contacts and contact pins, installation survey, as-built configuration		GF00.19-P-7000A

REMOVE CONTACTS FROM SENSOR SPADE-TYPE CONTACT PLUG - AR00.19-P-0120-01A

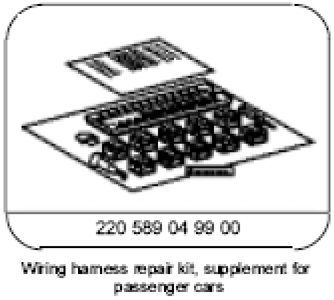


Fig. 408: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

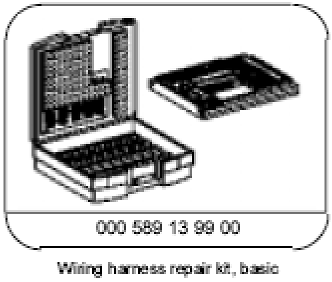


Fig. 409: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

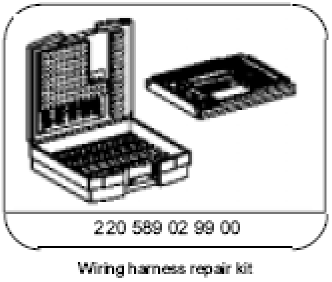


Fig. 410: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

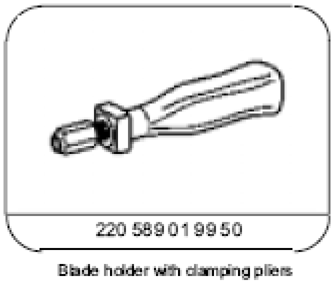


Fig. 411: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

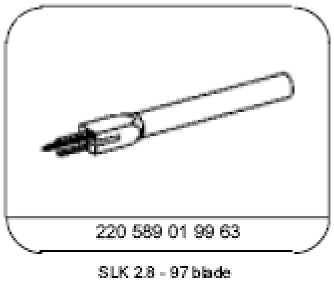


Fig. 412: Identifying SLK 2.8 - 97 Blade (220 589 01 99 63)

Unpin contact pins from the plug (SLK design 97)

1. Insert blade holder with clamping pliers and SLK 2.8 - 97 blade from front side into contact cavity of connector housing (4).

   i Both spring shackles on the contact pin (7) are pressed together and, simultaneously, the locking tab (5) of the connector housing (4) is lifted.

2. Remove contact pin (7) from connector housing (4) by gently pulling the corresponding line.

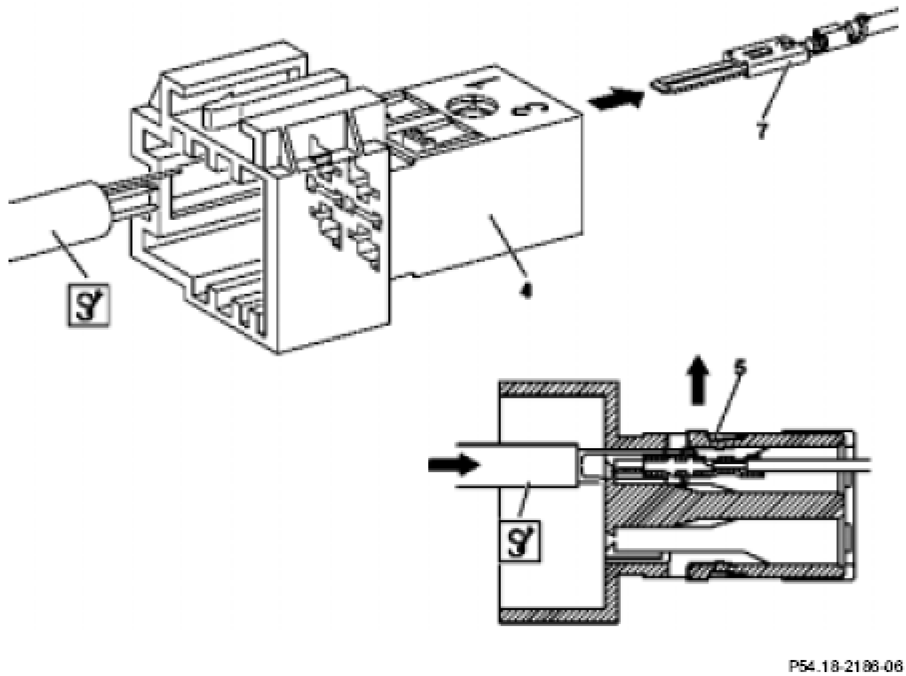


Fig. 413: Unpinning Contact Pins From Plug (SLK Design 97)

i Rocking the contact pin back and forth, thus making use of the full housing tolerance, may help to unpin the contact.

REMOVE CONTACTS FROM SENSOR LAMINATED CONTACT PLUG - AR00.19-P-0120-01B

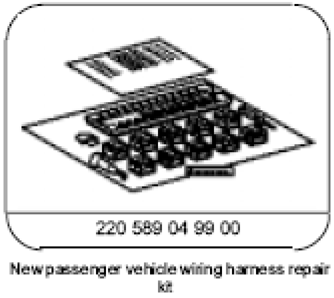


Fig. 414: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

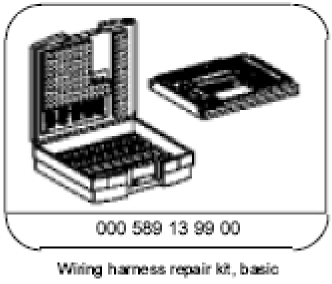
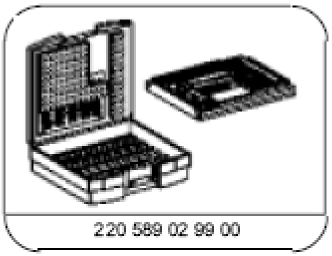
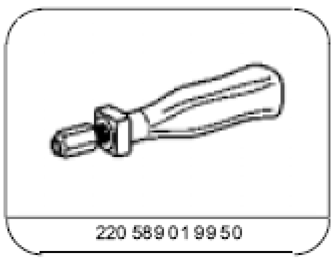


Fig. 415: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



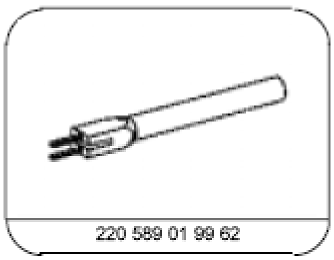
Wiring harness repair kit

Fig. 416: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



Blade holder with clamping pliers

Fig. 417: Identifying Blade Holder With Clamping Pliers (220 589 02 99 50)



SLK 2.8 blade

Fig. 418: Identifying SLK 2.8 Blade (220 589 02 99 62)

Secondary unlocking for version with contact retainer (SLK)

1. Using a suitable tool, push tabs of contact retainer (1) in direction of arrow out of locked position.

   Shown on 2-pin SLK connector

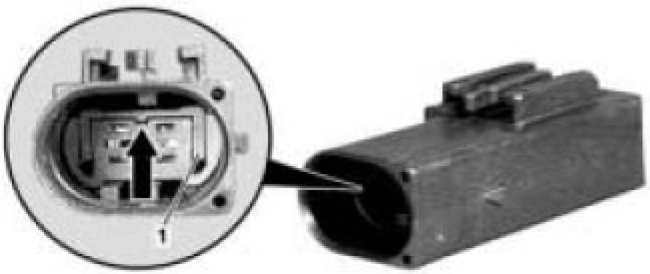


Fig. 419: Pushing Tabs Of Contact Retainer - Shown On 2-Pin SLK Connector

Unpin contact pins form connector (SLK)

1. Insert blade holder with clamping pliers and SLK 2.8 blade from front side through openings at contact cavity of connector (1).

   Insert tool carefully to prevent damaging webs at openings of contact cavity.

   This presses together the springs of the contact pin (2).

2. A slight tug on the corresponding cable will remove the contact pin from the connector.

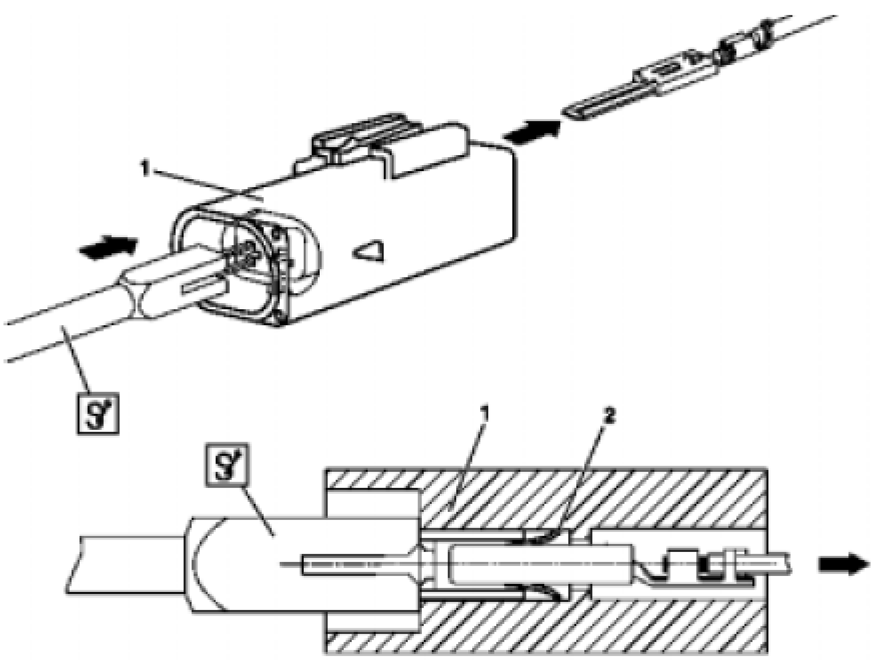


Fig. 420: Contact Pins From Connector (SLK)

i Rocking the contact pin back and forth, thus making use of the full housing tolerance, may help to unpin the contact.

REMOVE CONTACTS FROM SENSOR SPADE-TYPE CONTACT COUPLING - AR00.19-P-0120-02A

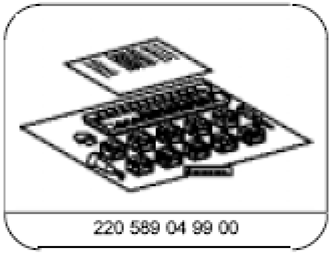


Fig. 421: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

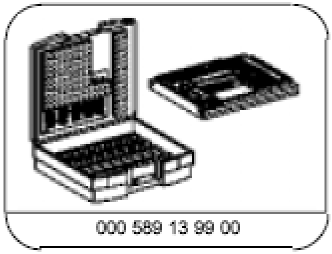


Fig. 422: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

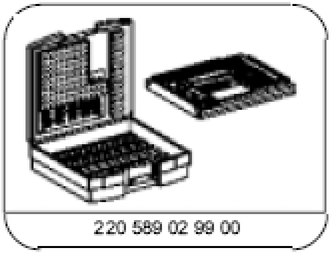


Fig. 423: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

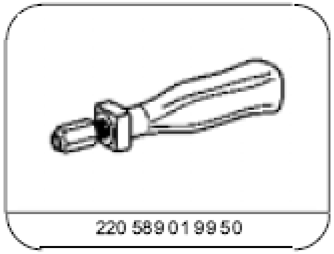


Fig. 424: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

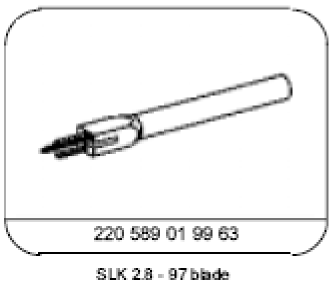


Fig. 425: Identifying SLK 2.8 - 97 Blade (220 589 01 99 63)

Unpin female contacts from coupling (SLK Design 97)

1. Insert blade holder with clamping pliers and SLK 2.8 - 97 blade from front side into contact cavity of coupling (4).

   i Both spring shackles on the female contact (7) are compressed and, simultaneously, the locking tab (5) on the coupling (4) is lifted.

2. A slight tug on the corresponding cable will remove the female contact (7) from the coupling.

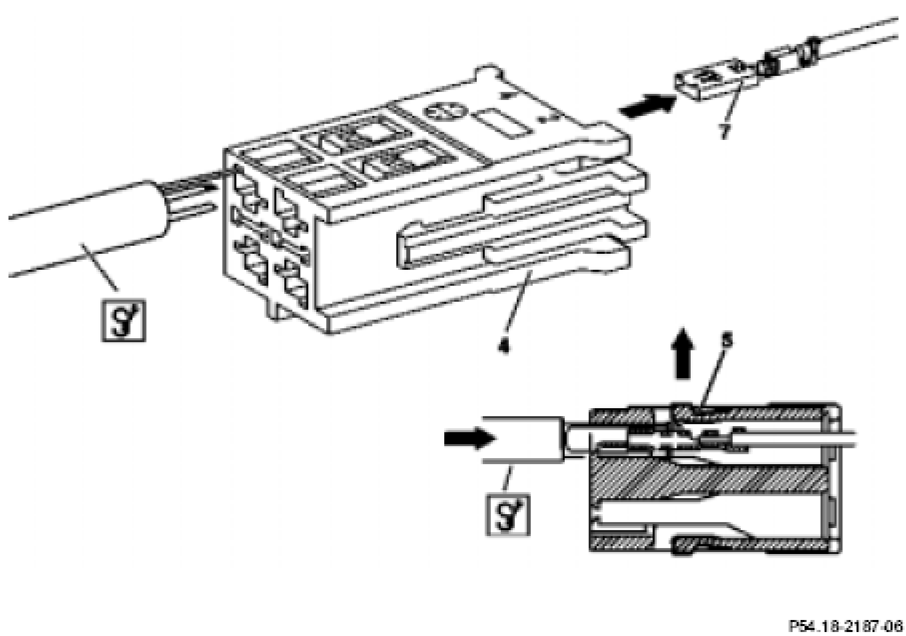
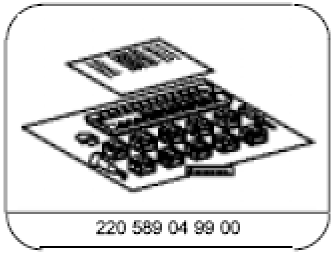


Fig. 426: Female Contacts From Coupling (SLK Design 97)

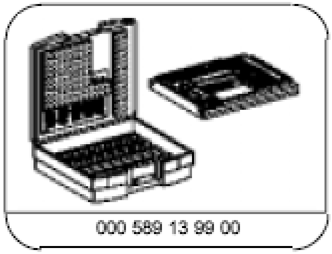
i Rocking the female contact back and forth making use of the full housing tolerance may help to unpin the contact.

REMOVE CONTACTS FROM SPADE-TYPE SENSOR CONTACT COUPLING - AR00.19-P-0120-02B



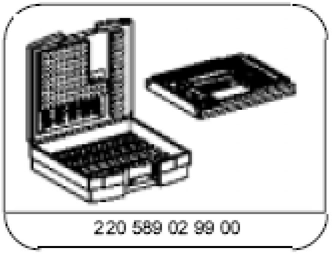
New passenger vehicle wiring harness repair kit

Fig. 427: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)



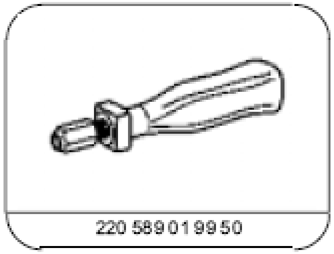
Wiring harness repair kit, basic

Fig. 428: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



Wiring harness repair kit

Fig. 429: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



Blade holder with clamping pliers

Fig. 430: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

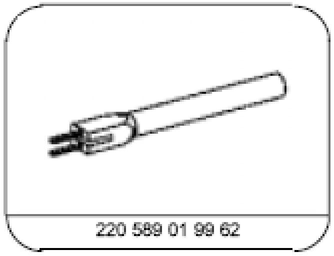


Fig. 431: Identifying SLK 2.8 Blade (220 589 01 99 62)

Secondary release for version with locking bar (SLK)

1. Using a suitable tool, push tabs of locking bar(1) in direction of arrow out of locked position.

Shown on a 6-pin SLK coupling

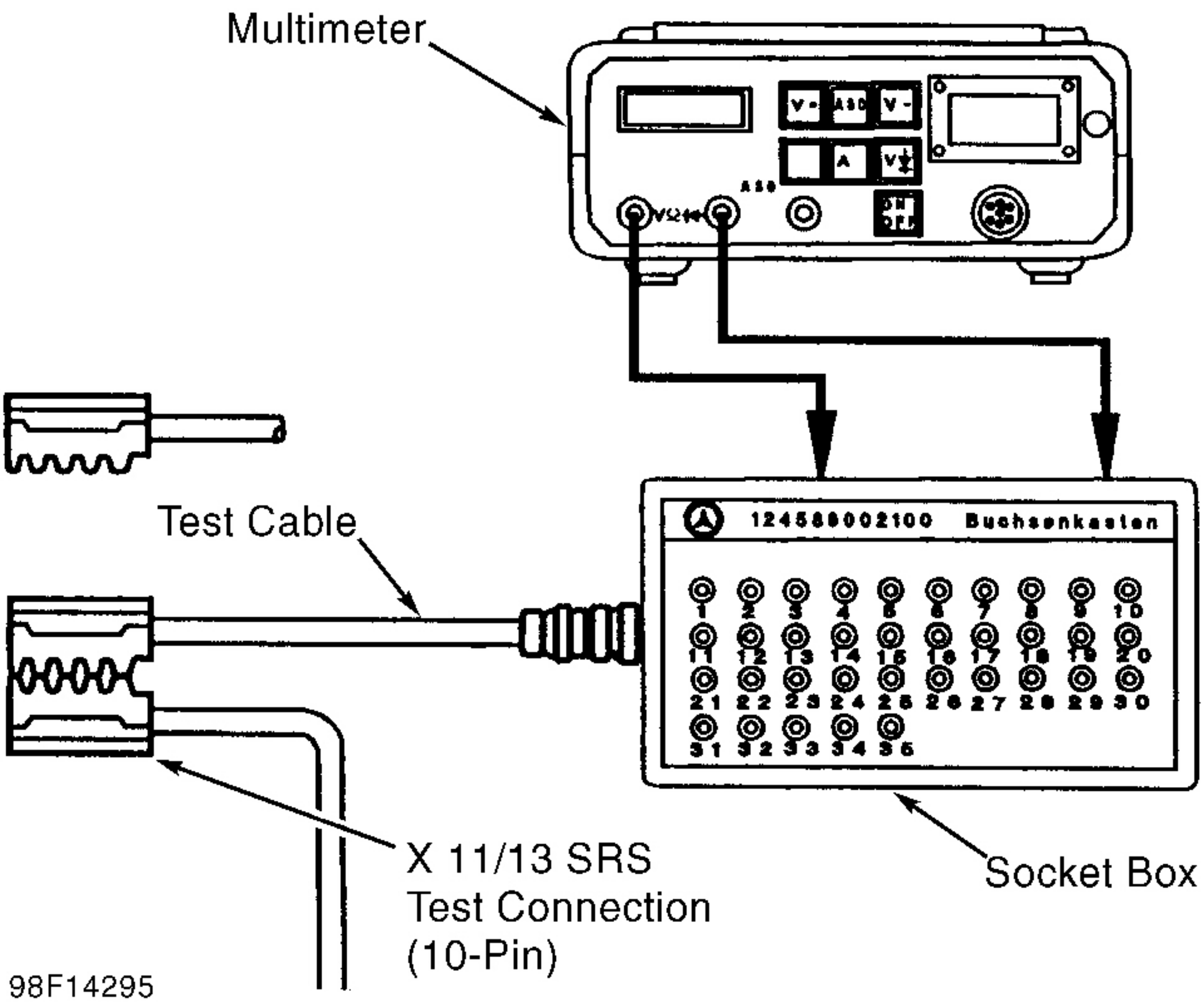


Fig. 432: Pushing Tabs Of Locking Bar - Shown On A 6-Pin SLK Coupling

Secondary release for version with locking slider (SLK)

1. Using a suitable tool, move locking slider (3) in direction shown by arrow.

   Shown on a 58-pin SLK coupling

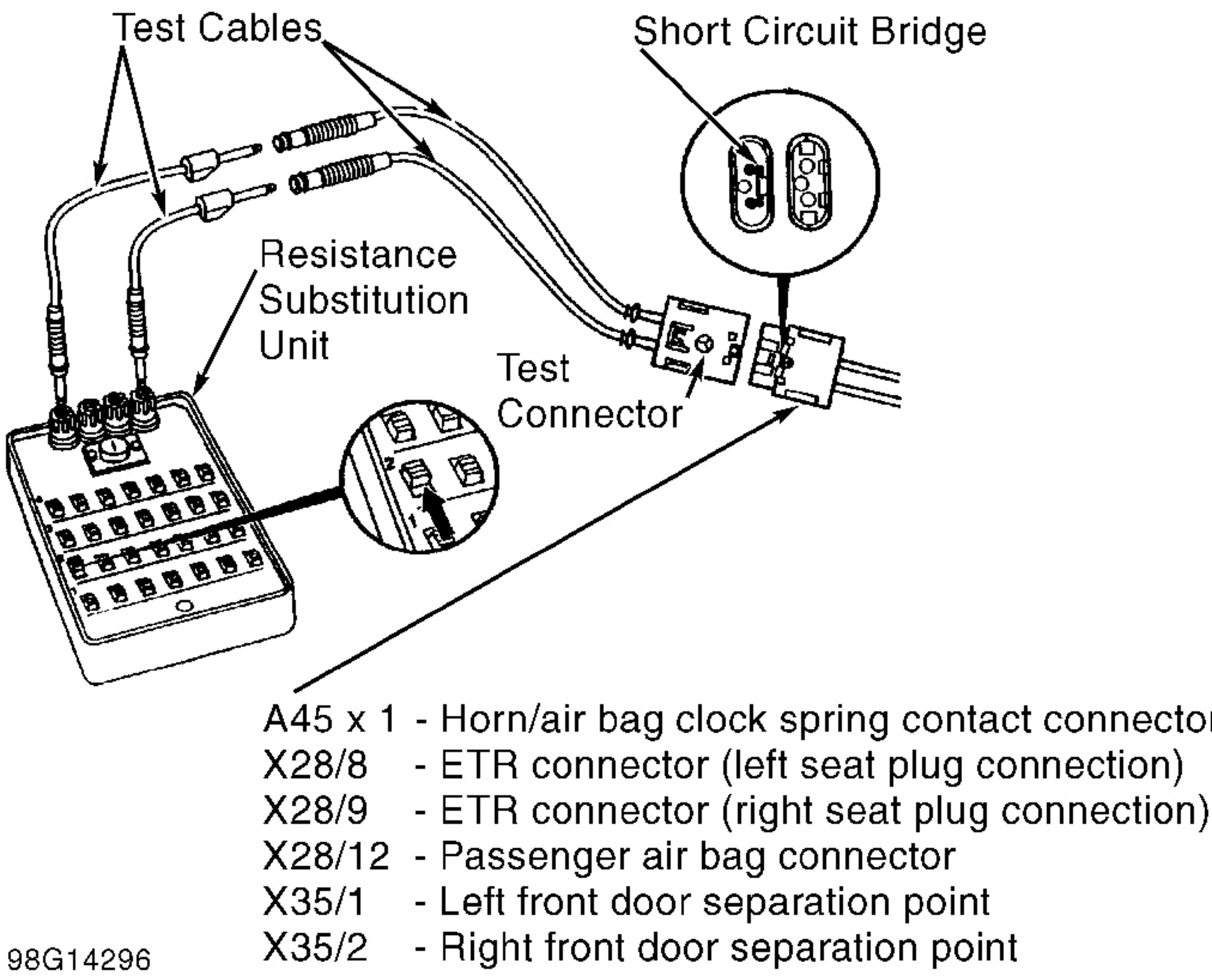


Fig. 433: Moving Locking Slider - Shown On A 58-Pin SLK Coupling

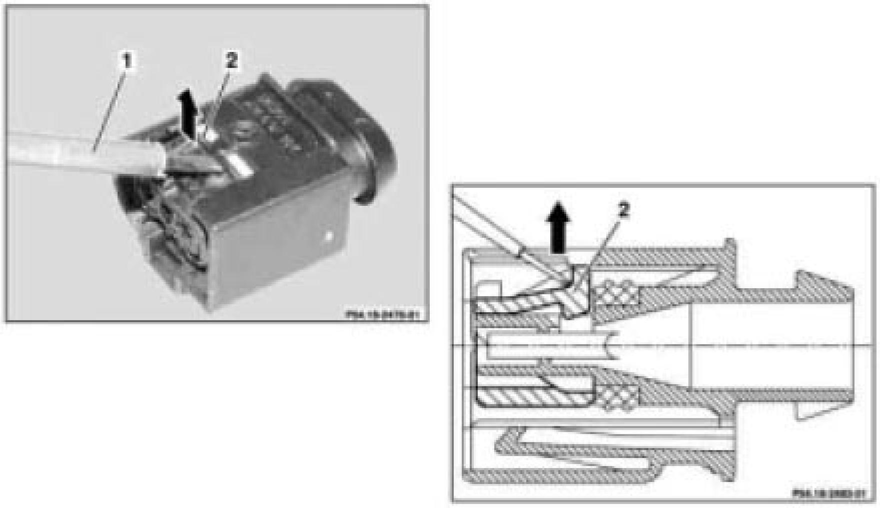
Secondary release for version with locking striker (SLK)

1. Using a suitable tool (1), pry up the locking striker (2) in direction shown by arrow.

   The seal may be damaged if the tool (1) is inserted too far. Prying up the locking striker (2) beyond the stop may destroy the locking striker (2).

   The locking striker (2) remains unlocked when the female contacts are unpinned.

Shown on a 2-pin SLK coupling



P54.18-2484-05

Fig. 434: Prying Up Locking Striker - Shown On A 2-Pin SLK Coupling

Unpin female contacts from coupling (SLK)

1. Insert blade holder with clamping pliers and an SLK 2.8 blade from the front side through the openings in the contact cavity of the coupling (1).

   This results in the spring shackles (2) being compressed.

2. A slight tug on the corresponding line will remove the female contact from the coupling.

   Rocking the contact pin back and forth, thus making use of the full housing tolerance, may help to unpin the contact.

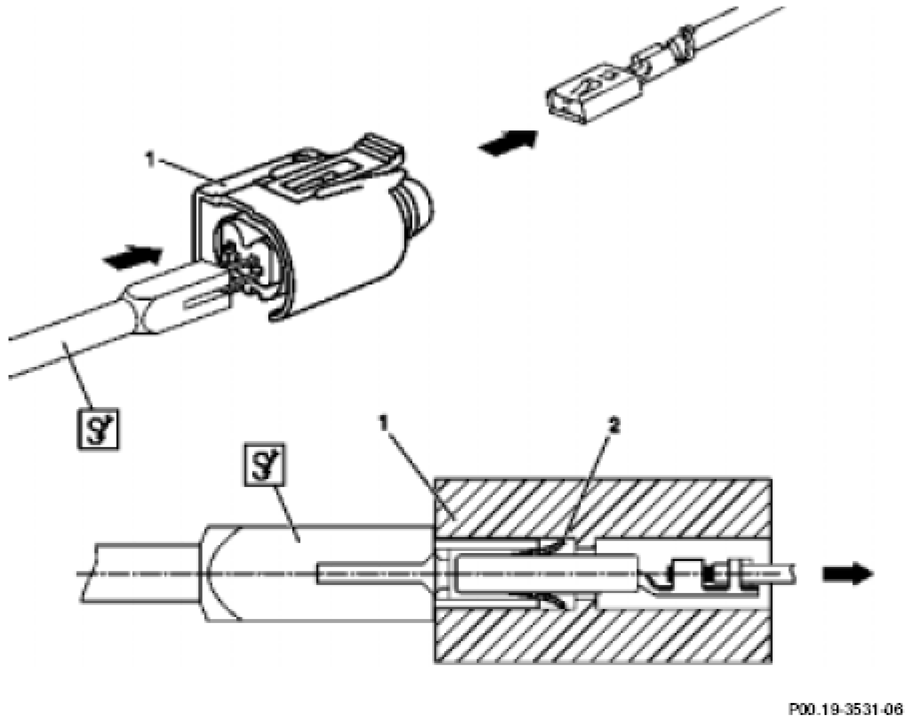


Fig. 435: Female Contacts From Coupling (SLK)

REMOVE CONTACTS FROM MICRO QUADLOCK SYSTEM PLUG - AR00.19-P-0120-03A

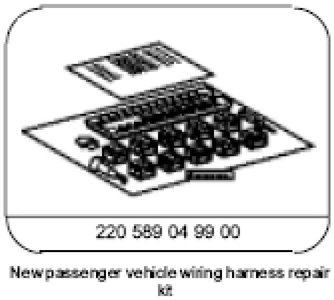


Fig. 436: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

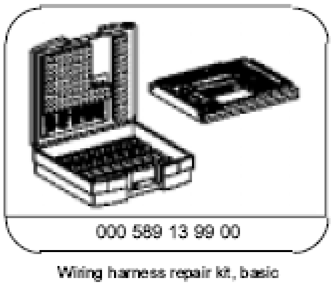


Fig. 437: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

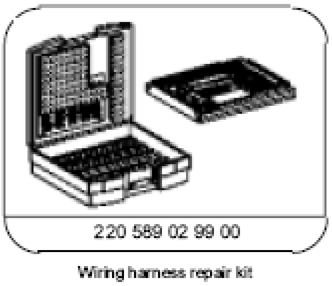


Fig. 438: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

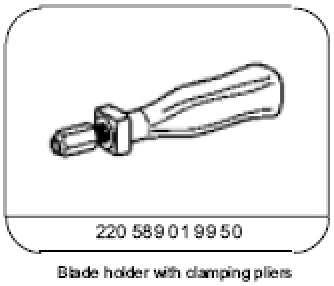


Fig. 439: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

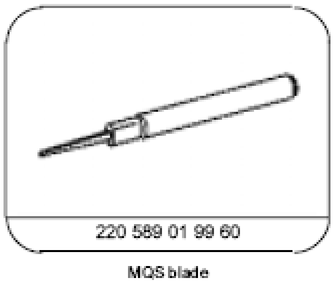


Fig. 440: Identifying MQS Blade (220 589 01 99 62)

Secondary unlocking for version with retaining cap (MQS)

1. Press lock tab of cap (1) out of connector housing (2).
2. Detach cap (1) from connector housing (2) in direction of arrow while holding down catch tab.

Shown on 18-pin MQS connector

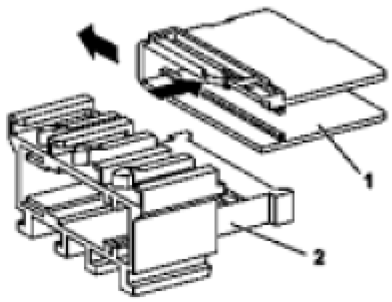


Fig. 441: Cap From Connector Housing - Shown On 18-Pin MQS Connector

Secondary unlocking for version with 2nd contact retainer (MQS)

1. Open contact retainer using a suitable tool and lift in direction of arrow.

Shown on 6-pin MQS connector

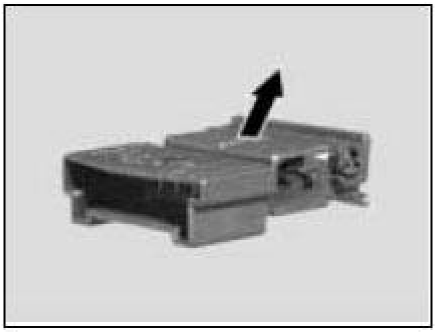


Fig. 442: Opening Contact Retainer - Shown On 6-Pin MQS Connector

Secondary unlocking for version with retaining cap (JPT)

1. Using a suitable tool, pry up the lock tab on the retaining cap (6).
2. Move retaining cap (6) in direction of arrow up to the stop.

   Illustrated on 4/8-pin JPT/MQS plug



Fig. 443: Moving Retaining Cap - Illustrated On 4/8-Pin JPT/MQS Plug

Unpin contact pins form connector (MQS)

1. Mount blade holder with clamping pliers and MQS blade from above through the opening (arrow) in the exposed connector housing (1) at the spring shackle of the male contact (2).
2. Press down the spring shackle of the male contact (2) and push the male contact (2) out of the contact cavity of the connector housing (1). Tug the corresponding cable at the same time to assist the removal procedure.

   Shown with circular conductor

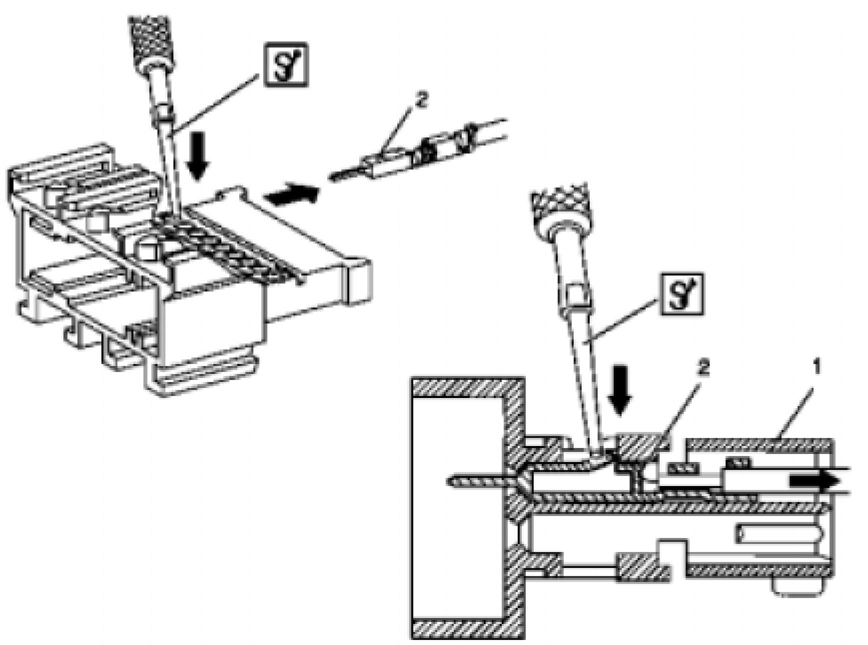
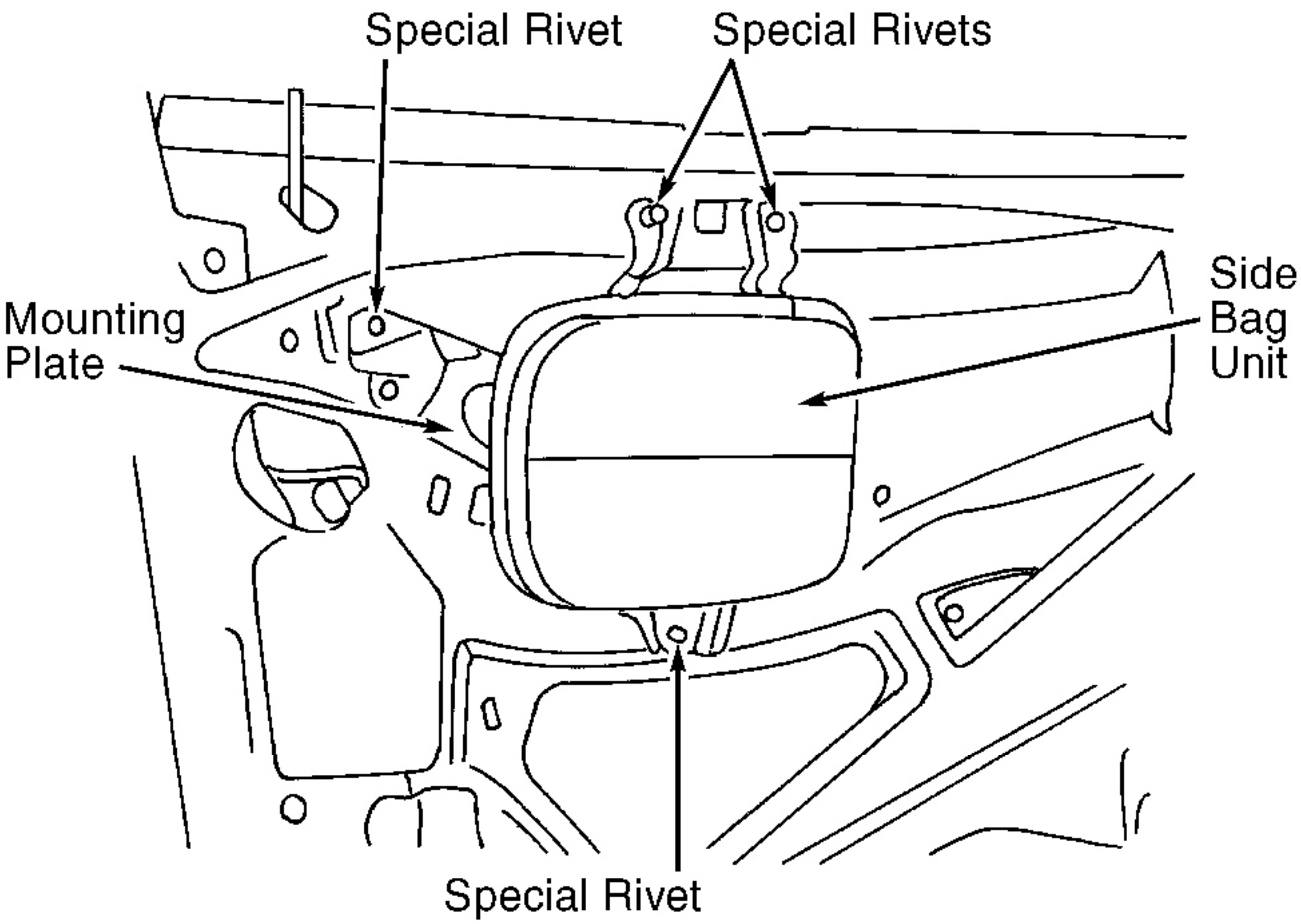


Fig. 444: Contact Pins From Connector (MQS) - Shown With Circular Conductor

Unpin male contacts from plug with 2nd contact retainer (MQS)

1. Position the blade holder with clamping pliers and MQS blade from above through the opening (3) of pin housing (1) at the spring shackle of male contact (2).
2. Press down spring shackle and pull male contact (2) all the way out of contact cavity of pin housing (1). Carry out the same work step in the opening (4). Tug the corresponding cable at the same time to assist the unpinning procedure.

Shown with circular conductor


Special Rivet
Special Rivets
Side
Bag
Unit
Mounting
Plate
Special Rivet

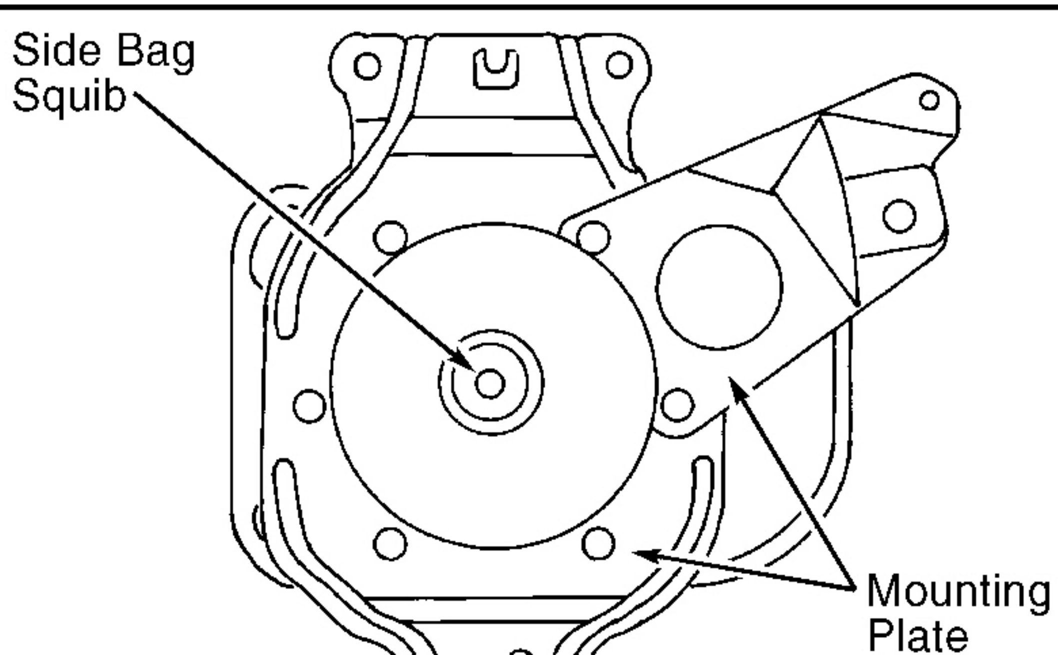

Side Bag
Squib
Mounting
Plate

Fig. 445: Male Contacts From Plug With 2ND Contact Retainer (MQS) - Shown With Circular Conductor

REMOVE CONTACTS FROM MICRO QUADLOCK SYSTEM PLUG - AR00.19-P-0120-03B



Fig. 446: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)



Fig. 447: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

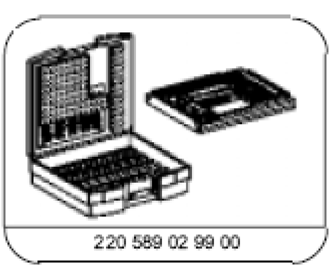


Fig. 448: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

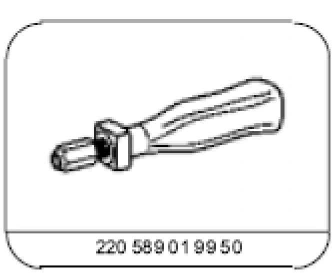


Fig. 449: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

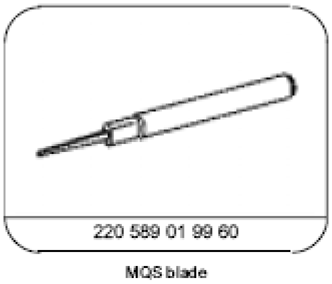


Fig. 450: Identifying MQS Blade (220 589 01 99 60)

Secondary unlocking for version with lock tab

1. Push suitable tool underneath locking shackles (1).
2. Pry up the lock tabs (1) in direction shown by arrow.

Shown on 8-pin MQS connector

DTC with fault code 1	DTC with fault code 2	Possible cause	Go to test step (See fig.)
	031	Front passenger seat occupied recognition with automatic child seat recognition (ACSR)	Replace ACSR
	032	Left side airbag (A53), communication interference	Electromagnetic interference, check harness routing if accessories installed
	033	Right side airbag, communication interference	Electromagnetic interference, check harness routing if accessories installed
	034	Digital crash output, harness fault (ARTHUR)	
	035	Analoge crash output, harness fault (model 170 Kompressor)	

99E00939

Fig. 451: Prying Up Lock Tabs - Shown On 8-Pin MQS Connector

Unpin contact pins form connector (MQS)

1. Insert blade holder with clamping pliers and MQS blade from front side through opening above contact cavity of connector housing (3).

   This presses down the spring on the contact pin (2).

2. A slight tug on the corresponding cable will pull the contact pin (2) out of the cavity of the plug.

Shown on 8-pin MQS connector

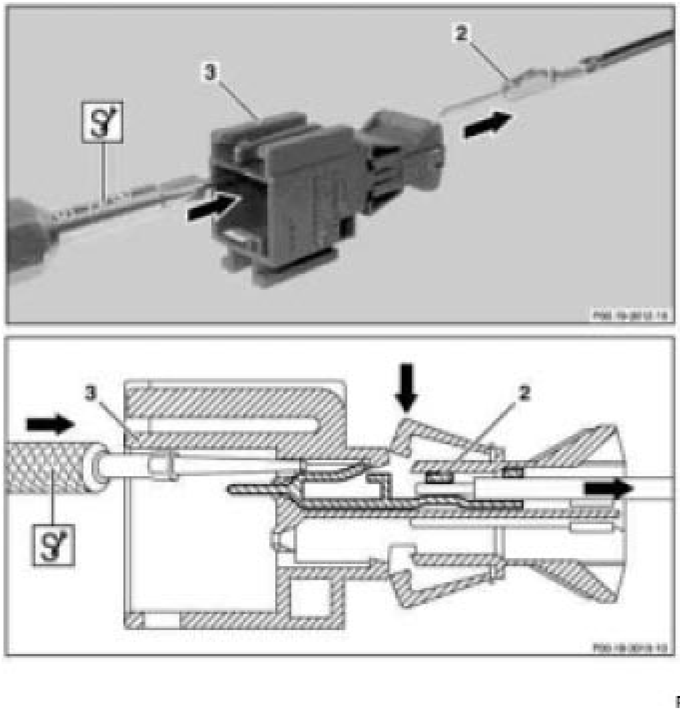


Fig. 452: Contact Pins From Connector (MQS) - Shown On 8-Pin MQS Connector

i Foil contacts must be unpinned at the same time. Tug on the foil while pressing down the spring to remove the foil.

REMOVE CONTACTS FROM MICRO QUADLOCK SYSTEM COUPLING - AR00.19-P-0120-04A

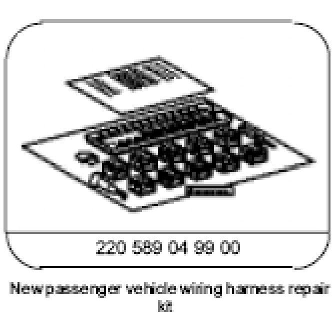


Fig. 453: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

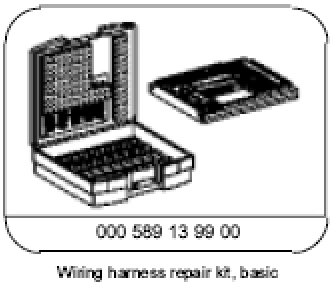


Fig. 454: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

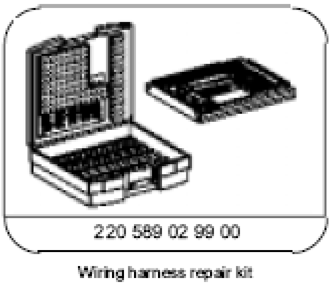


Fig. 455: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

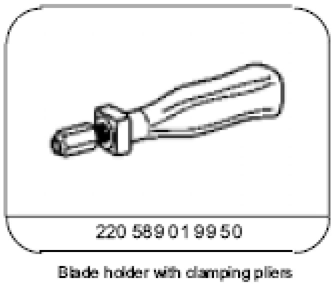


Fig. 456: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

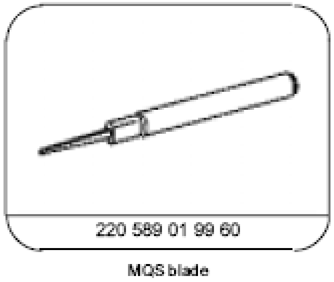


Fig. 457: Identifying MQS Blade (220 589 01 99 60)

Secondary unlocking for version with retaining cap (MQS)

1. Guide suitable tool (1) all the way into groove (4) from the side.

2. Remove retaining cap (2) from coupling housing (3) in direction of arrow.

Shown on 3/3-pin MQS coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
9.0	005 007	03 Front passenger AB squib (R12/8) > Ω < Ω		Ignition key in position "2".	√ F	⇒ 9.1
9.1		03 Front passenger AB squib (R12/8)	R12/8 1 — — 2	Remove ignition key. Remove glove box. Disconnect front passenger AB squib (R12/8) connector. Connect See fig. 55 Set resistance of 2 Ω. Ignition key in position "2".	√ F	Front passenger airbag unit. **Model 140:** SRS test connector (X11/13) not properly connected. **Model 202:** Airbag intermediate connector (X28/12) not properly connected. Model 140 ⇒ 9.2, except Modle 129, 140, 210 as of 03/97: ⇒ 9.3, All models: ⇒ 9.4
9.2		03 Right front ETR squib (R12/8) > Ω < Ω	X11/13 5 — Ω — 6	Remove ignition key. Disconnect X11/13. Connect See fig. 51	2 – 5 Ω	Wiring, ⇒ 9.4

99F00971

Fig. 458: Retaining Cap From Coupling Housing - Shown On 3/3-Pin MQS Coupling

Secondary unlocking for version with retaining housing (MQS)

1. Lift locking catch (2) of retaining cap (4) using a suitable tool (1).
2. Pull coupling housing (3) from retaining cap (4) in direction shown by arrow.

Shown on a 3/3-pin MQS/MCP coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
9.3		03 Right front ETR squib (R12/8)	X28/12 1 —( )— 2	Remove ignition key. Disconnect X28/12. Connect See fig. 54 Set resistance of 2 Ω. Ignition key in position "2".	√ F	Wiring, ⇒ 9.4
9.4	005 007	03 Front passenger AB squib (R12/8) > Ω < Ω	N2/2 13 —(Ω)— 14	Remove ignition key. Disconnect N2/2 connector. Connect See fig. 50	2 – 5 Ω	Wiring.
10.0	005 007	03 Front passenger AB squib (R12/8) ⌐1– ⌐1+	N2/2 6 —(Ω)— 14 5 —(Ω)— 14	**not** connected. Remove ignition key. Disconnect N2/2 connector. Connect See fig. 50	>20 kΩ >20 kΩ	Wiring, Short to circuit 31, 30, 15, 15R.

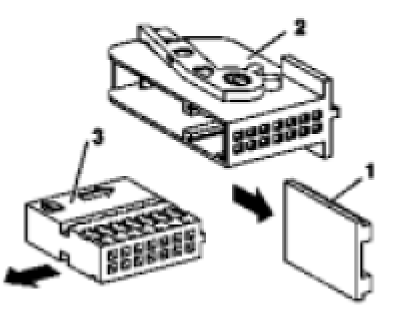
99G00972

Fig. 459: Pulling Coupling Housing From Retaining Cap - Shown On A 3/3-Pin MQS/MCP Coupling

Secondary unlocking for version with cap (MQS)

1. Detach cover (1) from cap (2) in direction of arrow over the catch mechanism.
2. Remove connector housing (3) from cap (2) in direction of arrow.

Shown on 14-pin MQS coupling with a connector housing



P54 13 2224 01

Fig. 460: Connector Housing From Cap - Shown On 14-Pin MQS Coupling With A Connector Housing

Secondary unlocking for version with 2nd contact retainer (MQS)

1. Using a suitable tool, open the contact retainer (1).
2. Pry up the contact retainer (1) in direction shown by arrow.

Shown on 6-pin MQS coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
13.0	025 017	08 Right front seat belt buckle switch (S68/4) -//- USA only		Ignition key in position "2". Seat belt buckle **not** latched. Seat belt buckle latched.	√ F OFF ON	Wiring, Open/short circuit to circuit 31, Right ESA connector block (X55/4) not properly connected.
13.1		08 Right front seat belt buckle switch (S68/4) USA only		Remove ignition key. Disconnect N2/2 connector. Connect See fig.1 **not** connected.		Wiring, Short to circuit 31, 30, 15, 15R, Seat belt buckle.
		Ω–	N2/2 6 — Ω — 8	Seat belt buckle **not** latched. Seat belt buckle latched.	280 – 580 Ω 70 – 279 Ω	
		Ω+	5 — Ω — 8		> 20 kΩ	

99I00974

Fig. 461: Prying Up Contact Retainer - Shown On 6-Pin MQS Coupling

Secondary unlocking for version with lock tab (MQS)

1. Push suitable tool underneath locking catches (1).
2. Pry up the lock tabs (1) in direction shown by arrow.

Shown on 8-pin MQS coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
14.0	073[1)]	Squibs < Ω > Ω R12/1 R12/2 R12/3 R12/8 Squibs in series R12/1–R12/2 R12/1–R12/3 R12/1–R12/8 R12/2–R12/3 R12/2–R12/8 R12/3–R12/8	N2/2 1 – Ω – 2 3 – Ω – 4 10 – Ω – 11 13 – Ω – 14 1 – Ω – 3 1 – Ω – 10 1 – Ω – 13 3 – Ω – 10 3 – Ω – 13 10 – Ω – 13	Remove ignition key. Disconnect N2/2 connector. Connect See fig. 50 **not** connected.	2 – 5 Ω 2 – 5 Ω 3 – 5 Ω 2 – 5 Ω > 20 kΩ > 20 kΩ > 20 kΩ > 20 kΩ > 20 kΩ > 20 kΩ	Wiring, Short circuit.
15.0	008	010 Left side airbag squib (R12/9) > Ω < Ω (only with left/right side airbag equipped vehicles)		connected. Ignition key in position "2".	√ F	⇒ 15.1

99J00975

Fig. 462: Prying Up Lock Tabs - Shown On 8-Pin MQS Coupling

Secondary unlocking for version with retaining housing (MQS)

1. Using a suitable tool, pry up the lock tab on the retaining cap (5).
2. Pull coupling housing (6) from retaining cap (5) in direction shown by arrow.

Shown on 12-pin MQS coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
15.1		010 Left side airbag squib (R12/9) (except Model 202 as of 06/97, Model 210 as of 03/97, Model 208) (Model 202 as of 07/97, Model 210 as of 03/97, Model 208)	X35/1 1 — 2 X35/41 1 — 2	Remove ignition key. Disconnect left front door separation point. Connect See fig.54 Set resistance of 2 Ω. Ignition key in position "2".	√ F	⇒ 15.2
15.2		010 Left side airbag squib (R12/9)	R12/9 1 — 2	Remove ignition key. Remove interior door panel. Connect See fig.55 Set resistance of 2 Ω. Ignition key in position "2".	√ F	Left side airbag, ⇒ 15.3
15.3	008	010 Left side airbag squib (R12/9) > Ω < Ω	N2/2 16 — Ω — 17	Remove ignition key. Disconnect N2/2 connector. Connect See fig.50	2 - 5 Ω	Wiring, Contacts.

99A00976

Fig. 463: Pulling Coupling Housing From Retaining Cap - Shown On 12-Pin MQS Coupling

Unpin female contacts from coupling (MQS)

1. Mount blade holder with clamping pliers and MQS blade from above through the opening in the exposed connector housing (1) at the spring of the female contact (2).
2. Press the spring shackle of the female contact (2) downward and push the female contact (2) out of the contact cavity of the connector housing (1). Tug the corresponding cable at the same time to assist the unpinning procedure.

Illustrated on an 18-pin MQS coupling with a connector housing (circular conductor)

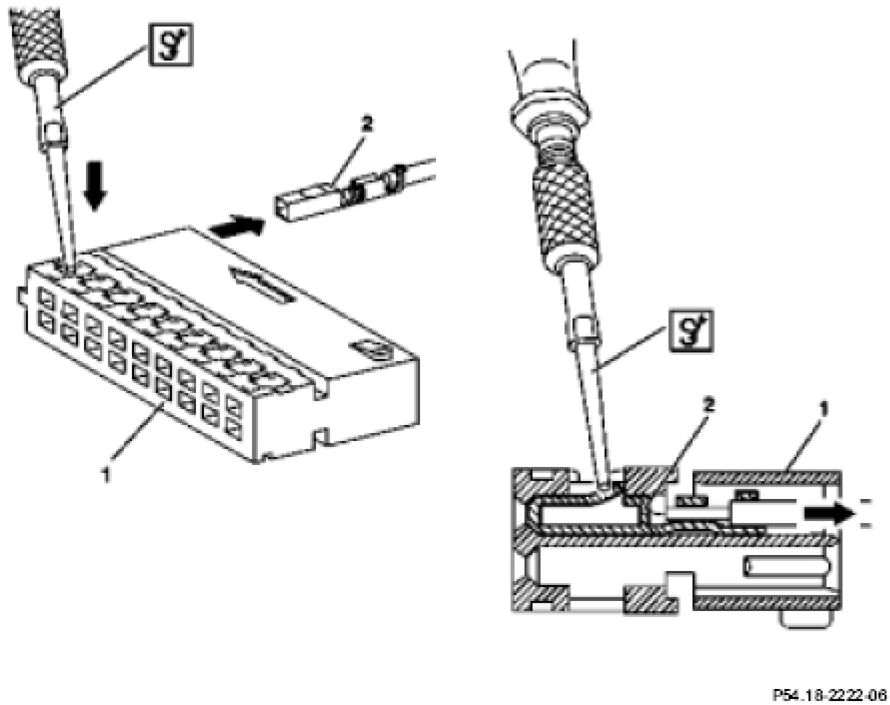


Fig. 464: Unpinning Female Contacts From Coupling (18-Pin MQS Coupling)

Illustrated on a 2-pin MQS coupling (circular conductor)

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
16.2		012 Left side airbag sensor (A53) **Insulation fault** Γ1-	N2/2 6 — Ω — 20 5 — Ω — 20	Connect See fig.55 Disconnect connector at A53.	>20 kΩ >20 kΩ	Wiring shorted to circuit 31 Wiring shorted to circuit 30, 15, 15R.
17.0	009	010 Right side airbag squib (R12/10) > Ω < Ω (only with left/right side airbag equipped vehicles).		Ignition key in position "2".	√ F	⇒ 17.1
17.1		010 Right side airbag squib (R12/10) (except model 202 as of 06/97, Model 210 as of 03/97, Model 208) (Model 202 as of 07/97, Model 210 as of 03/97, Model 208)	X35/1 1 — 2 X35/42 1 — 2	Remove ignition key. Disconnect left door separation point connector. connector. Set resistance of 2 Ω. See fig.53 Ignition key in position "2".	√ F	⇒ 17.2

99C00978

Fig. 465: Unpinning Female Contacts From Coupling (2-pin MQS Coupling)

Unpin female contacts from coupling with 2nd contact retainer (MQS)

1. Mount blade holder with clamping pliers and MQS blade from above through the opening (3) of the connector housing (1), press down spring shackle of female contact (2), and pull female contact (2) out of contact cavity of connector housing (1) up to the stop.
2. Mount blade holder with clamping pliers and MQS blade from above through the opening (4), press down spring shackle of female contact (2), and pull female contact (2) out of contact cavity of connector housing (1).

   [i] Tug the corresponding cable at the same time to help unpinning procedure.

REMOVE CONTACTS FROM MICRO QUADLOCK SYSTEM COUPLING - AR00.19-P-0120-04B

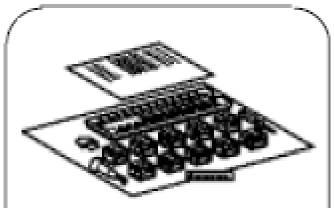

220 589 04 99 00
New passenger vehicle wiring harness repair kit

Fig. 466: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

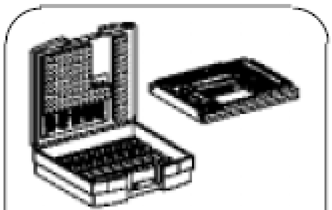

000 589 13 99 00
Wiring harness repair kit, basic

Fig. 467: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

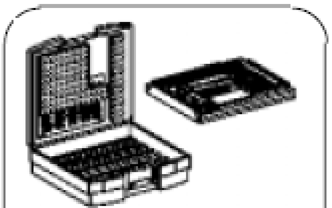

220 589 02 99 00
Wiring harness repair kit

Fig. 468: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

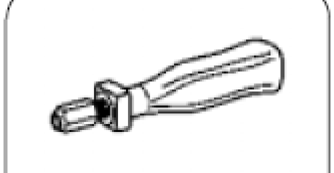

220 589 01 99 50
Blade holder with clamping pliers

Fig. 469: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

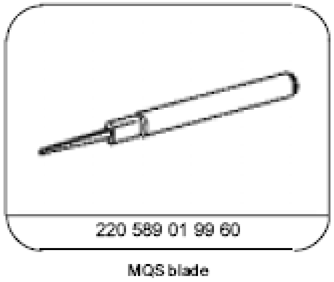


Fig. 470: Identifying MQS Blade (220 589 01 99 60)

Secondary release for version with sliding plate (MQS)

1. Using a suitable tool, move both sliding plates (1) in housing in direction of arrow over catch mechanism.

Shown on 38-pin JPT, MQS coupling

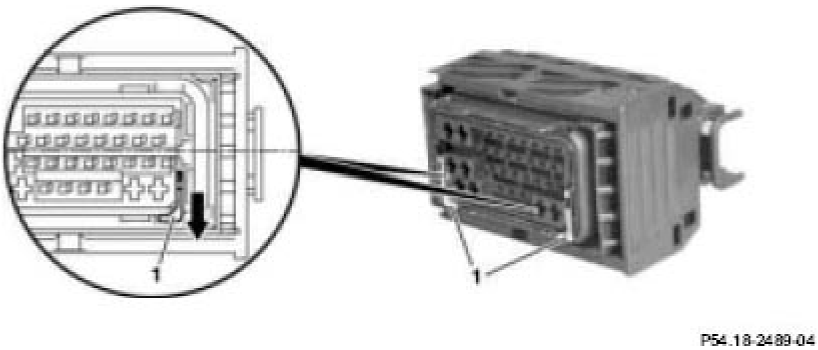


Fig. 471: Moving Both Sliding Plates In Housing - Shown On 38-Pin JPT, MQS Coupling

Secondary release for version with retaining cage (MQS)

1. Using a suitable tool (1), slide retaining cage (2) into pre-locking position in direction shown by arrow.

Shown on a 47-pin MQS or MCP coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
3.3		Driver AB squib (R12/3) **Resistance**	N2/7 9 —(Ω)— 10 (33) (34)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect , See fig. 52	2 – 5 Ω	Wiring.
4.0	B1859	Driver AB squib (R12/3) **Short circuit test** Γ1– Γ1+	N2/7 32 —(Ω)— 9 (56) (33) 5 —(Ω)— 9 (29) (33)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect See fig. 52	>20 kΩ >20 kΩ	Wiring, Short circuit after circuit 31, 30, 15, 15R
5.0	B1861	Front passenger AB squib (R12/8) **HHT actual values**		Ignition key in position "2".	√ F	⇒ 5.1

99C00945

Fig. 472: Sliding Retaining Cage - Shown On A 47-Pin MQS Or MCP Coupling

Unpin female contacts from coupling (MQS)

1. Insert blade holder with clamping pliers and MQS blade from front side through the opening near contact cavity of coupling.

   This step presses the spring shackle on the female contact (1) down into position.

2. A slight tug on the corresponding line will remove the female contact (1) from the coupling.

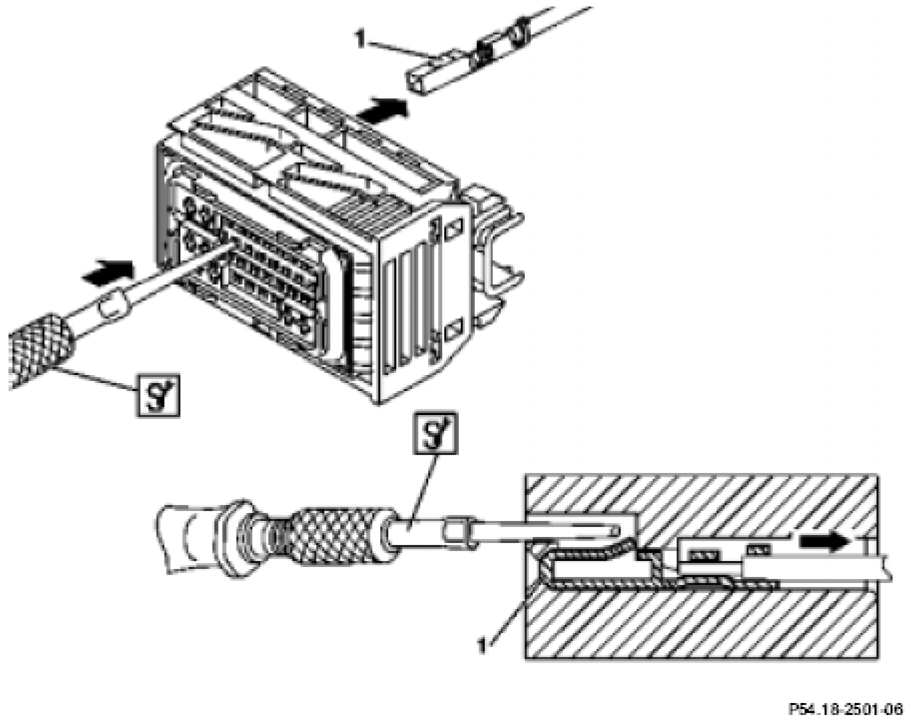


Fig. 473: Female Contacts From Coupling (MQS)

REMOVE CONTACTS FROM E 95 COUPLING - AR00.19-P-0120-05A

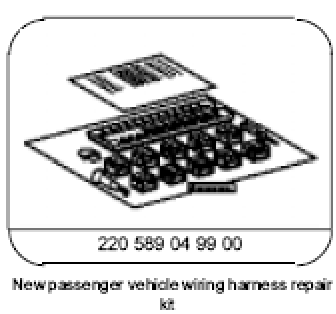


Fig. 474: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)



Fig. 475: Identifying Wiring Harness Repair Kit Basic (000 589 13 99 00)

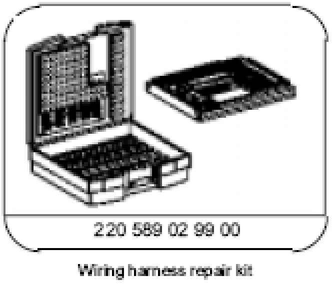


Fig. 476: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

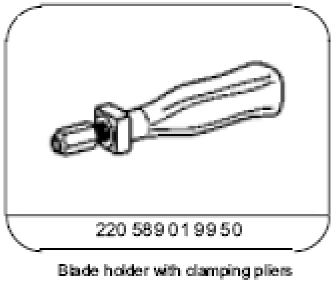


Fig. 477: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

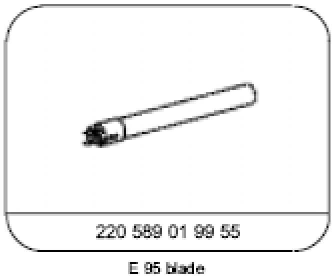


Fig. 478: Identifying E 95 Blade (220 589 01 9 55)

Secondary unlocking for version with tab (E 95)

1. Using a suitable tool, push tab in direction of arrow out of locked position.

Shown on 27-pin E 95 coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
13.2		RR side airbag squib (R12/12) **HHT actual values**	R12/12 1 — — 2	Remove ignition key. Remove door panel. Connect , See fig. 55 Set resistance to 3 Ω, Ignition key in position "2".	√ F	R12/12 ⇒ 13.3
13.3		RR side airbag squib (R12/12) **Resistance**	N2/7 29 (53) — Ω — 30 (54)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect , See fig. 52	2 – 5 Ω	Wiring.
14.0	B1873	RR side airbag squib (R12/12) **Short circuit test** ⊓– ⊓+ **(Only for side airbag in rear door)**	N2/7 32 (56) — Ω — 29 (53) 5 (29) — Ω — 29 (53)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect See fig. 52	>20 kΩ >20 kΩ	Wiring, Short circuit after circuit 31, 30, 15, 15R

99C00952

Fig. 479: Pushing Tab - Shown On 27-Pin E 95 Coupling

Secondary unlocking for version with slider (E 95)

1. Using a suitable tool, move slider in direction of arrow into the pre-locking position (1).

Shown on 29-pin E 95 coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
15.0	B1310	Left side airbag sensor (A53/1) **Voltage supply**	A53/1 2 —(−V+)— 2	Remove ignition key. Disconnect connector on A53/1. Connect test cables, See fig. 56 Ignition key in position "2".	11 – 14 V	Wiring.
15.1	B1310	Left side airbag sensor (A53/1) **Wiring fault**	N2/7 52 (76) —(−Ω+)— 3 A53/1	Remove ignition key. Disconnect connector on A53/1. Disconnect connector on N2/7, Connect, See fig. 52	< 1 Ω	Wiring.
15.2		Left side airbag sensor (A53/1) **Short circuit test** ┌┐– ┌┐+	N2/7 32 (56) —(−Ω+)— 52 (76) 5 (29) —(−Ω+)— 52 (76)	Remove ignition key. Disconnect connector on A53/1 Disconnect connector on N2/7 using aid. Connect See fig. 52	> 20 kΩ > 20 kΩ	Wiring, Short circuit after circuit 31, 30, 15, 15R

99D00953

Fig. 480: Moving Slider - Shown On 29-Pin E 95 Coupling

Secondary unlocking for version with retainer (E 95)

1. Push retainer (1) in direction of arrow out of locked position using a suitable tool.

   ⓘ The seal may be damaged if the tool is inserted too.

Shown on 4-pin E 95 coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
16.0	B1311	Right side airbag sensor (A54/1) **Voltage supply**	A54/1 1 —(-V+)— 2	Remove ignition key. Disconnect connector on A54/1. Connect test cables, See fig. 56 Ignition key in position "2".	11 - 14 V	Wiring.
16.1		Left side airbag sensor (A54/1) **Wiring fault**	N2/7 [connector] 54 (78) —(-Ω+)— 3 A53/1	Remove ignition key. Disconnect connector on A53/1. Disconnect connector on N2/7, Connect [connector], See fig. 52	< 1 Ω	Wiring.
16.2	B1867	Left side airbag sensor (A54/1) **Short circuit test** Γ1–	N2/7 [connector] 32 (56) —(-Ω+)— 54 (78)	Remove ignition key. Disconnect connector on A54/1, Disconnect connector on N2/7 using aid.	> 20 kΩ	Wiring, Short circuit after circuit 31, 30, 15, 15R
		Γ1+	5 (29) —(-Ω+)— 54 (78)		> 20 kΩ	

99E00954

Fig. 481: Pushing Retainer - Shown On 4-Pin E 95 Coupling

Secondary unlocking for version with contact retainer (E 95)

1. Press on tabs of contact retainer between contact cavities (3, 5 or 4, 6) using a suitable tool.
2. Open contact retainer.

Shown on 6-pin E 95 coupling

⇒		Test scope/ Actual value no. and text	Test connection	Test condition	Nominal value/ display	Possible cause/Remedy
17.0	BIB63	Driver ETR squib (R12/1) **HHT actual values**		Ignition key in position "2".	√ F	 ⇒ 17.1
17.1		Driver ETR squib (R12/1) **HHT actual values**	R12/1 1 — — 2	Remove ignition key. Disconnect connector on R12/1, Connect , See fig. 55 Set resistance to 3 Ω, Ignition key in position "2".	√ F	R12/1 ⇒ 17.2
17.2		Driver ETR squib (R12/1) **Resistance**	N2/7 33 (57) — Ω — 34 (58)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect , See fig. 52	2 – 5 Ω	Wiring
18.0	BIB63	Driver ETR squib (R12/1) **Short circuit test** Γ1– Γ1+	N2/7 32 (56) — Ω — 33 (57) 5 (29) — Ω — 33 (57)	Remove ignition key. Disconnect connector on N2/7 using aid. Connect , See fig. 52	>20 kΩ >20 kΩ	Wiring, Short circuit after circuit 31, 30, 15, 15R

99F00955

Fig. 482: Opening Contact Retainer - Shown On 6-Pin E 95 Coupling

Unpin female contacts from coupling (E 95)

1. Insert blade holder with clamping pliers and E 95 blade from front side through openings on contact cavity of coupling (2).

   Insert tool carefully to prevent damaging webs between contact cavity and openings for release tool.

   This pushes together the springs at the female contact (1).

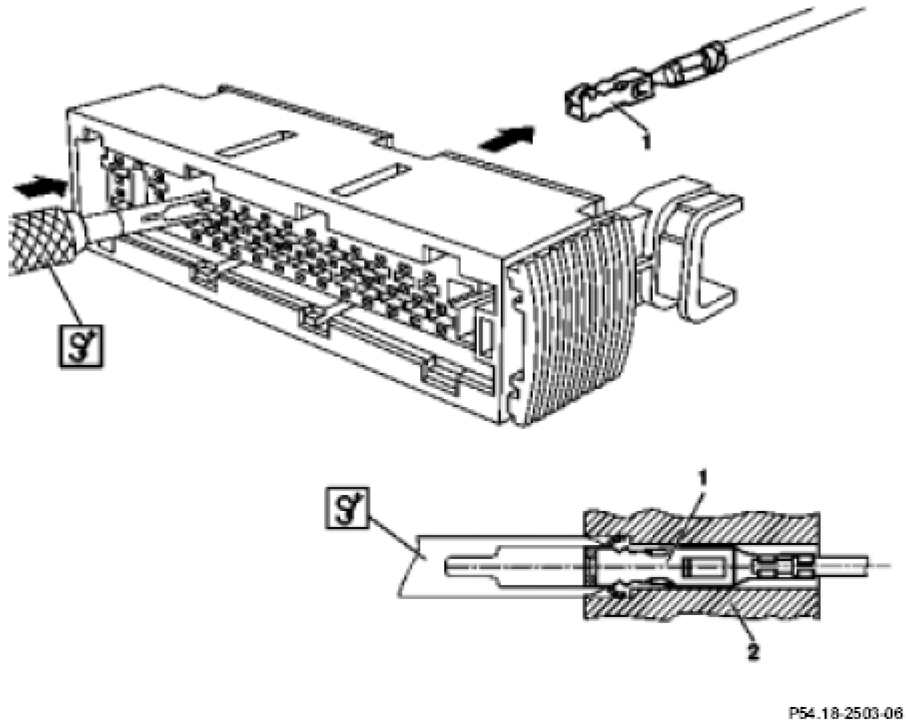


Fig. 483: Female Contacts From Coupling (E 95)

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling (2).

REMOVE CONTACTS FROM MICRO TIMER 3 COUPLING - AR00.19-P-0120-06A

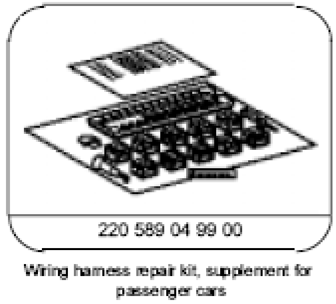


Fig. 484: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

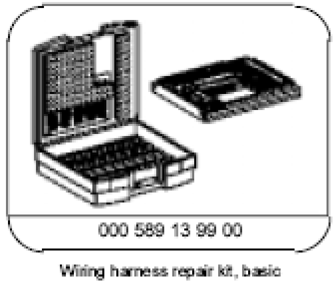
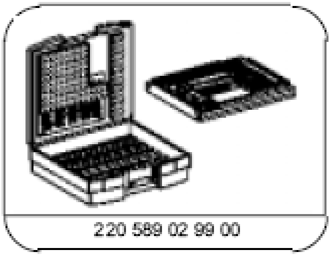
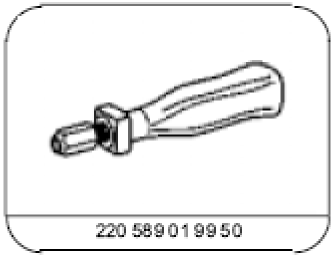


Fig. 485: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



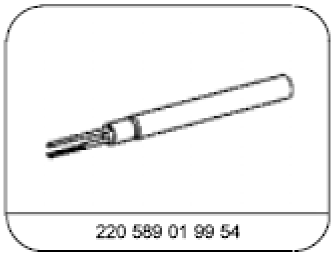
Wiring harness repair kit

Fig. 486: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



Blade holder with clamping pliers

Fig. 487: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)



MT 3 blade

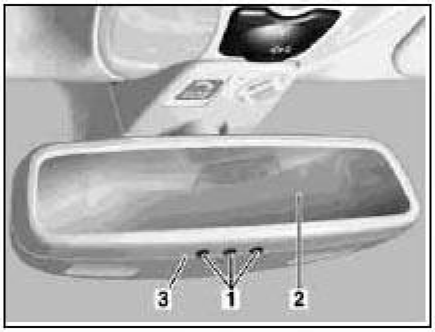
Fig. 488: Identifying MT 3 Blade (220 589 01 99 54)

Secondary release on version with sliding plate (MT 3)

1. Push sliding plate out of locked position using a suitable tool.

Shown on 16-pin MT 3 coupling

1 Garage door opener transmitter buttons
2 Interior rearview mirror
3 LED



P68.05-2038-01

Fig. 489: Pushing Sliding Plate - Shown On 16-Pin MT 3 Coupling

Secondary release on version with locking slider (MT 3)

1. Lever slider out of locked position using a suitable tool.

Shown on 4-pin MT 3 and JPT coupling

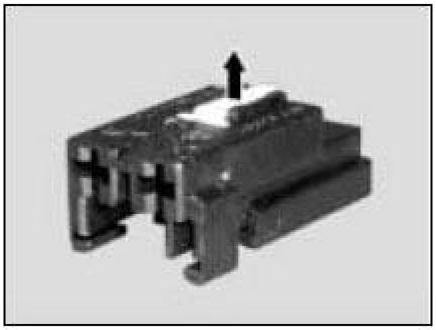

P54.18-2618-01

Fig. 490: Removing Lever Slider Out Of Locked Position - Shown On 4-Pin MT 3 And JPT Coupling

Unpin the female contact from the coupling (MT 3)

1. Insert blade holder with clamping pliers and MT 3 blade from front side through openings on contact cavity of coupling.

   Do not damage webs between contact cavity and openings for release tool.

   This pushes together the springs at the female contact (1).

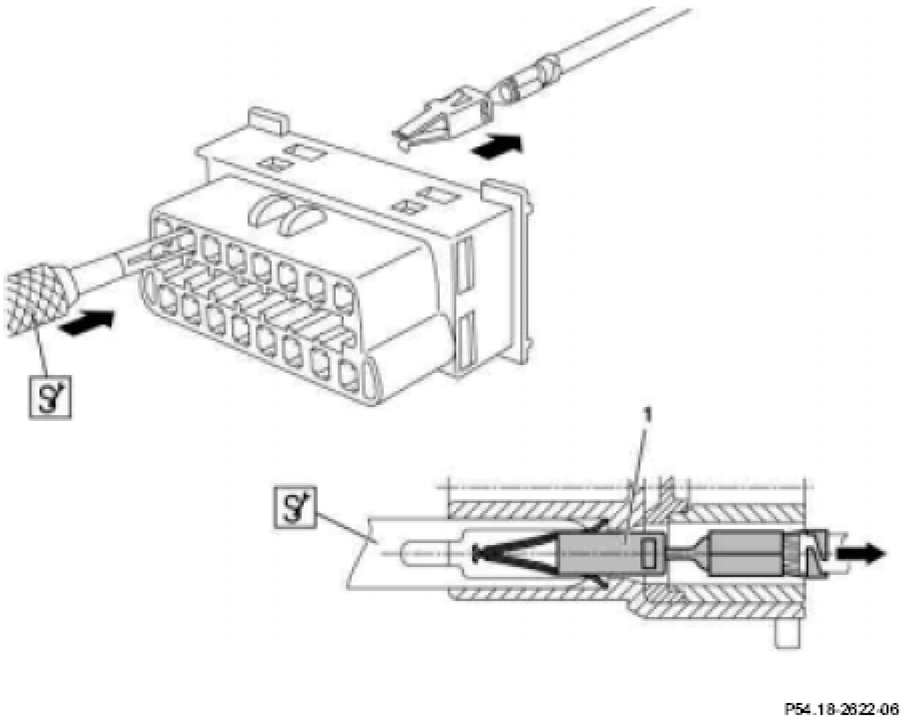


Fig. 491: Female Contact From Coupling (MT 3)

2. A slight tug on the corresponding cable will remove the female contact from the coupling.

REMOVE CONTACTS FROM JUNIOR POWER TIMER COUPLING - AR00.19-P-0120-07A

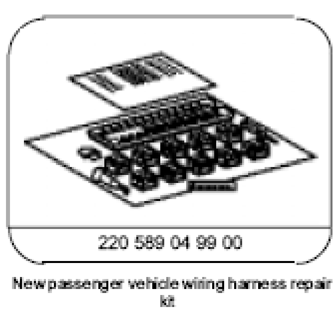


Fig. 492: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

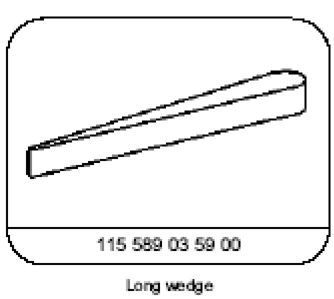
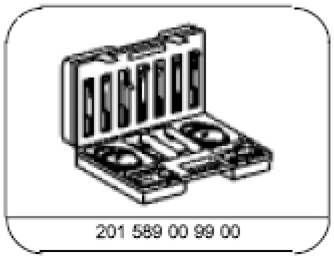


Fig. 493: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



Electrical connection set

Fig. 494: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

	Scope of test	Measuring instrument/ Test connection	Operation/Requirement	Specified value	• Possible cause/Remedy
1.0	**Garage door opener transmitter (A26/10)** Voltage supply **Model 163 as of 1.6.98**	A — A26/10 (V) — B	Ignition: **OFF** Disconnect garage door opener transmitter (A26/10) plug connection. Ignition: **ON**	11-14 V	• Specified value not in order: - Fuse 10 (F1f10) - Cables • Specified value in order: Replace garage door opener transmitter (A26/10)

Fig. 495: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

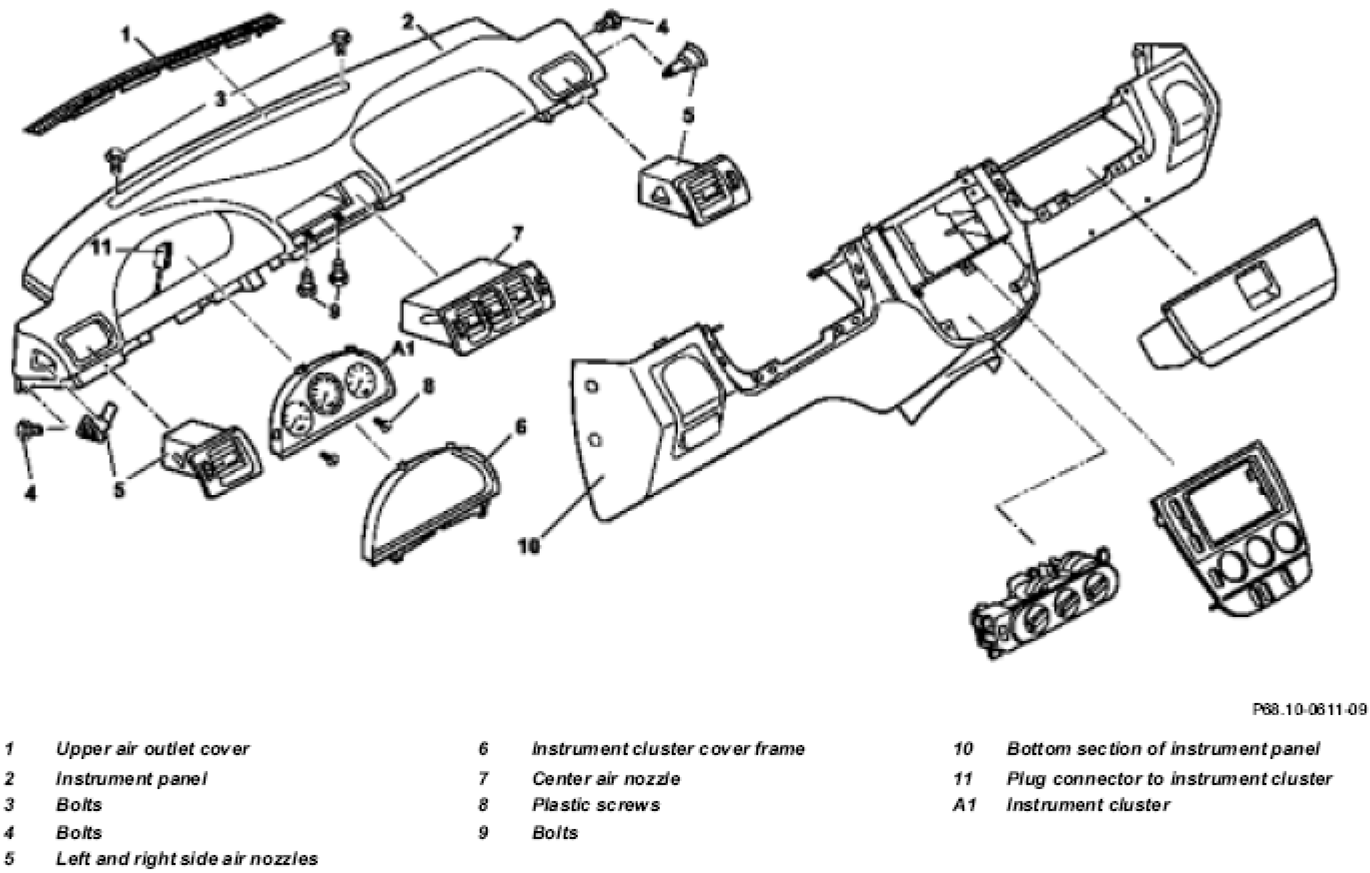


Fig. 496: Identifying JPT /SPT Blade (220 589 01 99 61)

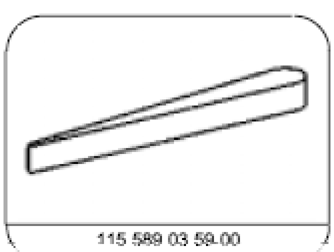
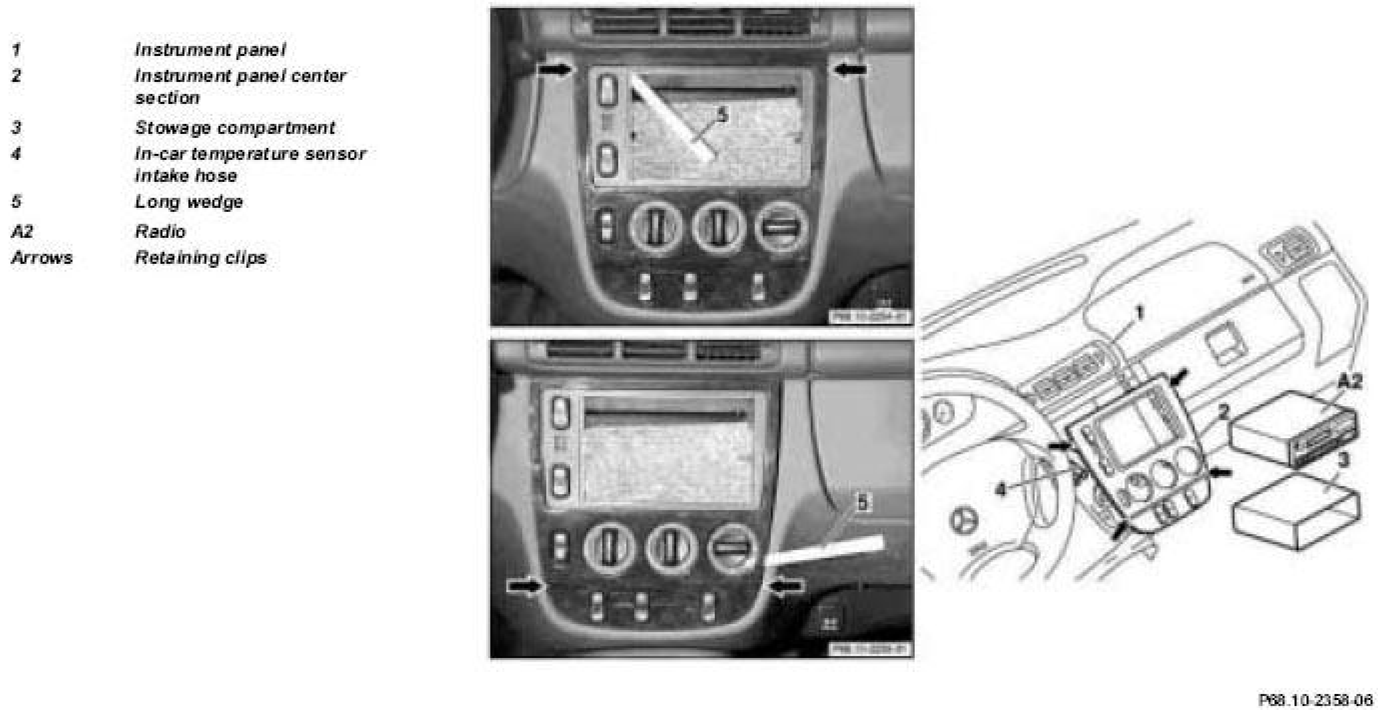


Fig. 497: Identifying MCP 2.8 / Fl Blade. 2.8 / JPT / SPT (000 589 13 99 30)

Secondary unlocking for version with tab (JPT)

1. Using a suitable tool, at the line side unlock the lugs (1) on lock tab.
2. Open the tab.

Shown on 6-pin JPT coupling

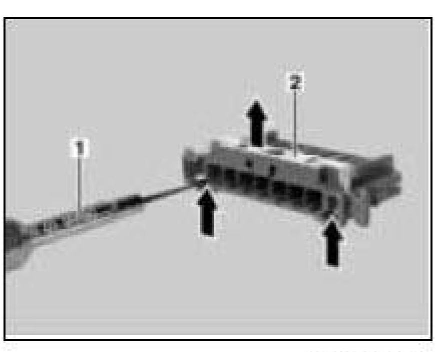


<u>**Fig. 498: Opening Tab - Shown On 6-Pin JPT Coupling**</u>

Secondary unlocking for version with retainer (JPT)

1. Lift side tabs of retainer (2) using a suitable tool (1).
2. Pull retainer in direction of arrow.

Shown on 7-pin JPT coupling



<u>**Fig. 499: Pulling Retainer - Shown On 7-Pin JPT Coupling**</u>

Secondary unlocking for version with cap (JPT)

1. Lift locking catch (2) of cap (4) using a suitable tool (1).
2. Pull coupling housing (3) out of cap in direction of arrow.

Shown on 8-pin JPT coupling

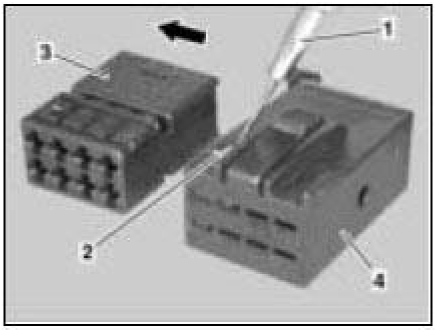


Fig. 500: Pulling Coupling Housing - Shown On 8-Pin JPT Coupling

Secondary unlocking for version with locking striker (JPT)

1. Lever off locking striker (2) using a suitable tool (1).

   The seal (3) may be damaged if the tool (1) is inserted too far. Prying up the locking striker (2) beyond the stop may destroy the locking striker (2).

   The locking striker (2) remains unlocked when the female contacts are unpinned.

   Shown on 5-pin JPT coupling

1	*Side window nozzle*
2	*Air intake pipe*
3	*Side air nozzle*
Arrows	*Catch*

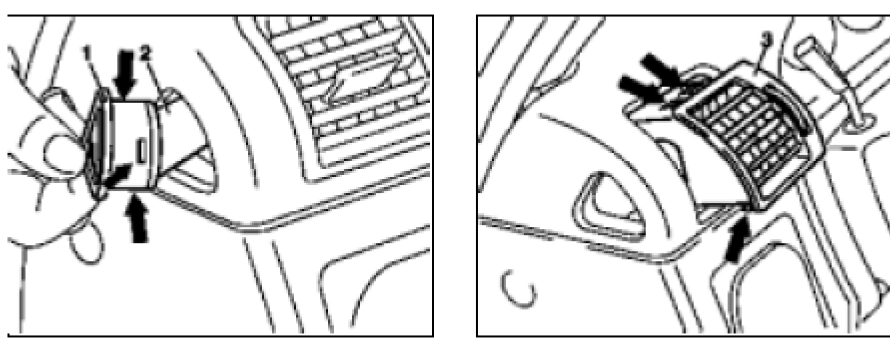


Fig. 501: Identifying Locking Striker And Seal - Shown On 5-Pin JPT Coupling

Secondary unlocking for version with sliding plate (JPT)

1. Using a suitable tool, move both sliding plates (1) in housing in direction of arrow over catch mechanism.

Shown on 38-pin JPT, MQS coupling

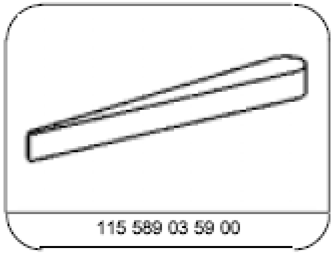


Fig. 502: Moving Both Sliding Plates - Shown On 38-Pin JPT, MQS Coupling

Secondary unlocking for version with contact retainer (JPT)

1. Using a suitable tool, move contact retainer (1) in direction of arrow out of locked position.

Shown on 9-pin JPT coupling



Fig. 503: Moving Contact Retainer - Shown On 9-Pin JPT Coupling

Secondary unlocking for version with spring (JPT)

1. Insert a suitable tool between spring (1) and housing and press out spring.

Shown on a 7-pin JPT and SPT coupling

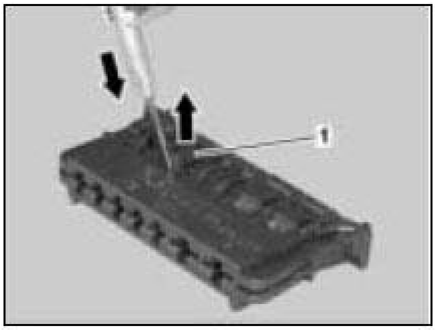


Fig. 504: Pressing Out Spring - Shown On A 7-Pin JPT And SPT Coupling

Secondary unlocking for version with slider (JPT)

1. Push (1) slider out of locked position in direction of arrow.

Shown on 6-pin LSK, JPT coupling

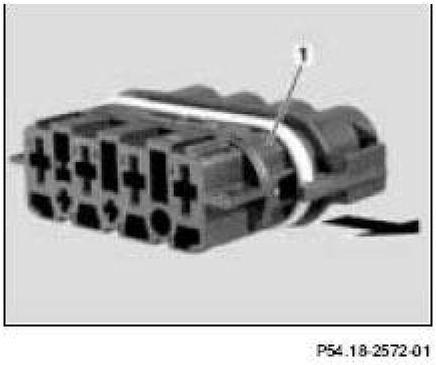


Fig. 505: Pushing Slider Out - Shown On 6-Pin LSK, JPT Coupling

Secondary release for version with lock tab

1. Insert a suitable tool from the side under the lock tab on coupling (5).
2. Open the lock tab in direction of arrow.

Shown on 5-pin JPT coupling

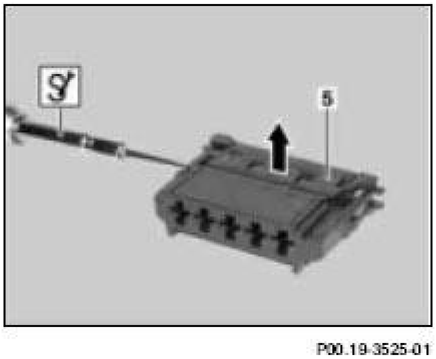


Fig. 506: Opening Lock Tab - Shown On 5-Pin JPT Coupling

Secondary unlocking for version with retainer in internal coupling (JPT)

1. Press locking catches of retaining cap (1) using a suitable tool and remove retaining cap.
2. Lift spring at coupling housing (2) using a suitable tool and push out internal JPT coupling (3).

3. Press tabs of retainer (4) out of detent.
4. Open retainer (4).

Shown on 4-pin JPT, MPT coupling

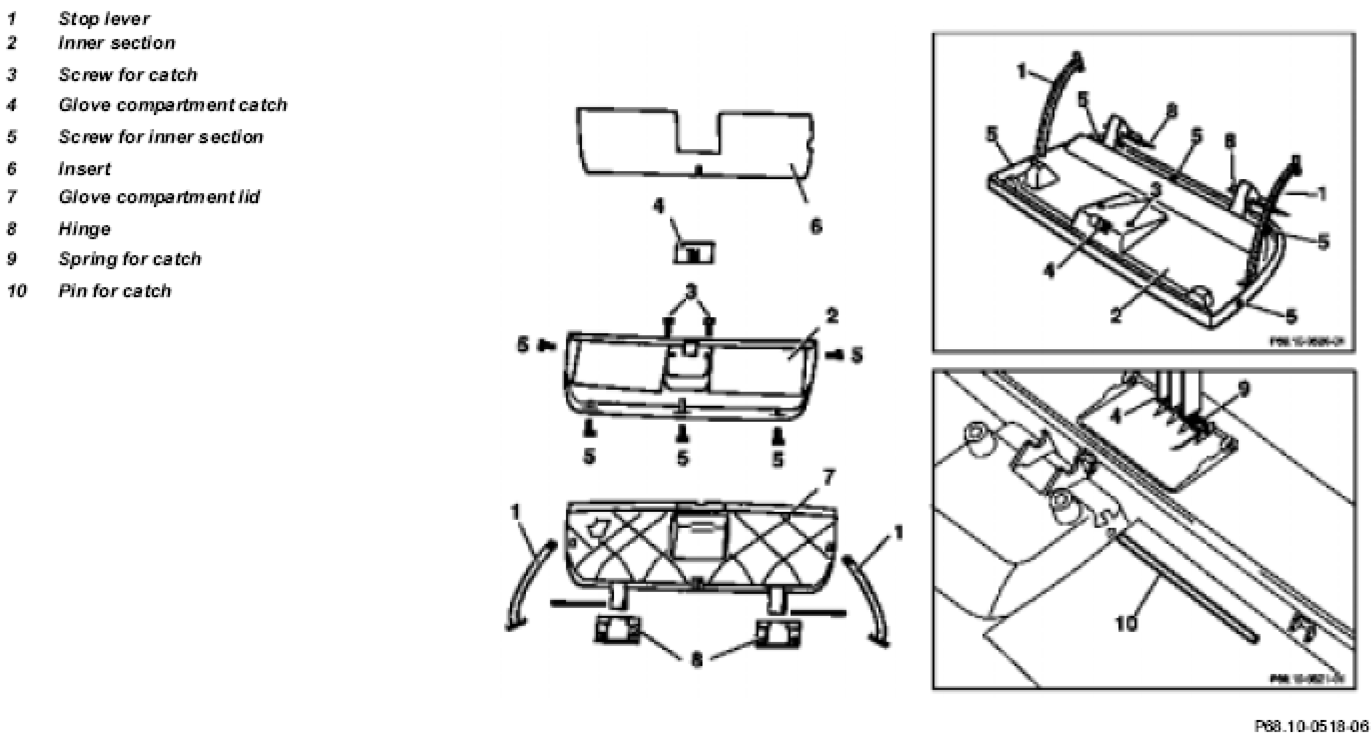


Fig. 507: Identifying Retaining Cap, Coupling Housing And Retainer - Shown On 4-Pin JPT, MPT Coupling

Unpin female contacts from coupling (JPT)

1. Insert blade holder with clamping pliers with JPT/SPT blade or MCP 2.8/Fl. 2.8/JPT/SPT blade from the front through the openings in contact cavity of coupling.

   This presses together the springs of the female contact (1).

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling.

1	Glove compartment lid
2	Instrument panel
3	Screws
4	Striker eye
5	Hinge screw
6	Hinge
Arrows	Air gap and adjustment possibilities on hinge

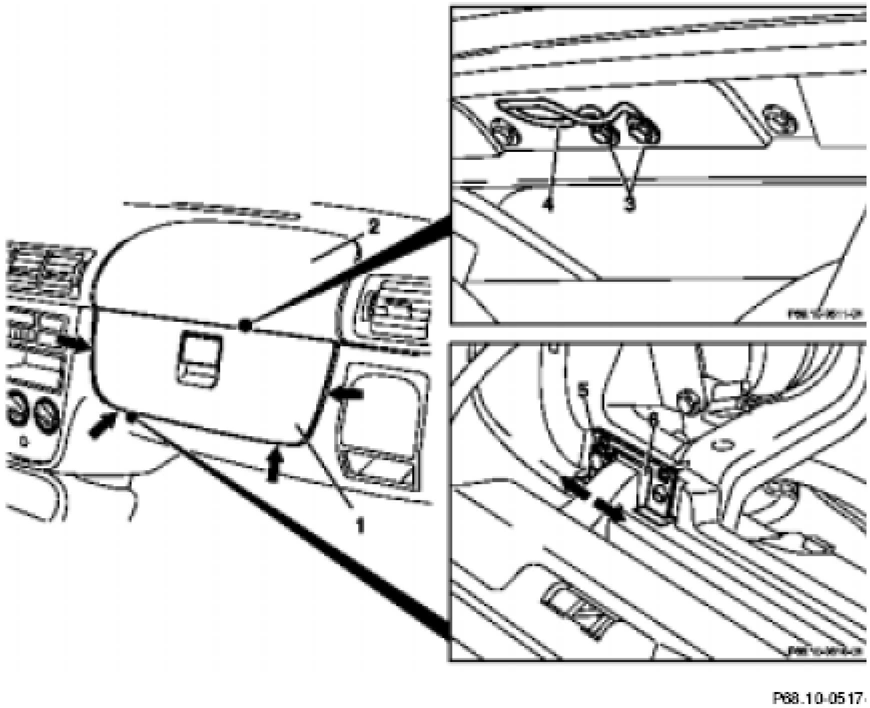


Fig. 508: Female Contacts From Coupling (JPT)

REMOVE CONTACTS FROM JUNIOR POWER TIMER PLUG - AR00.19-P-0120-08A

1	Striker eye
2-7	Screws
8-9	Stop buffer
10	Glove compartment
E13/1	Glove compartment lamp

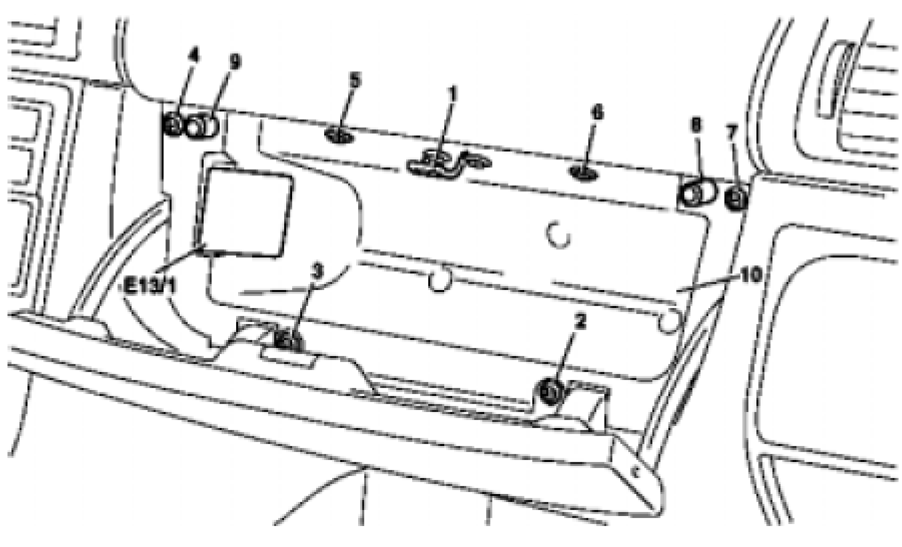
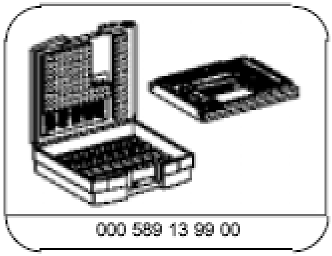
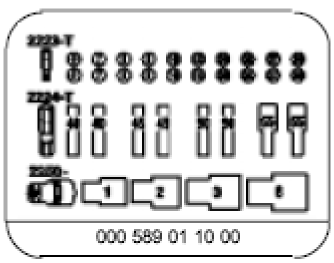


Fig. 509: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)



Wiring harness repair kit, basic

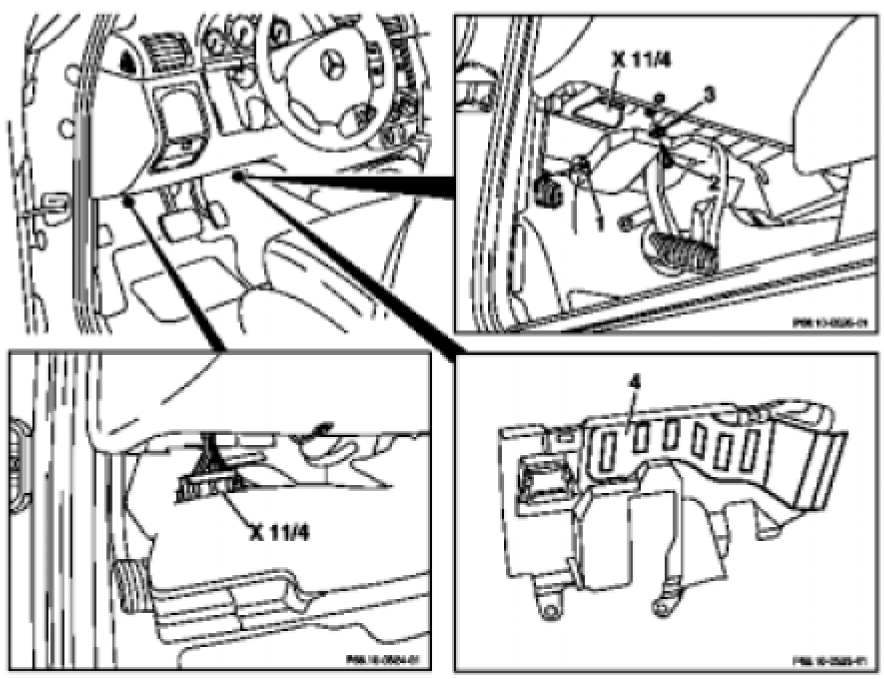
Fig. 510: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



Torx bit set

Fig. 511: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

1	*Plugs*
2	*Bolt*
3	*Clips*
4	*Cover*
X11/4	*Datalink connector*



P68.10-0522-06

Fig. 512: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

1	*Cover*
2	*Plug-in clips*
3	*Catch*
X58/1	*Interior socket*

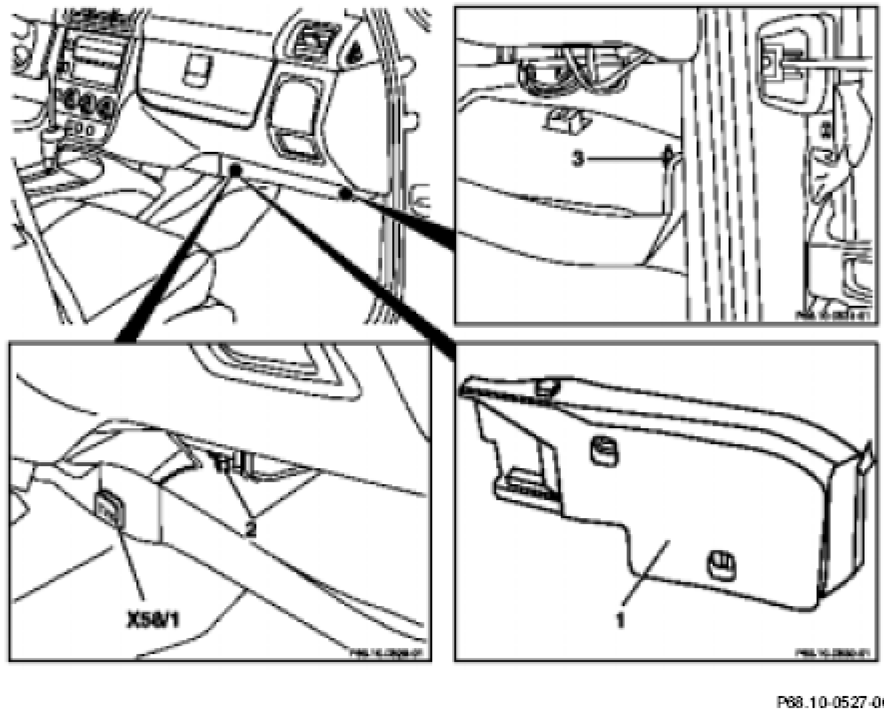


Fig. 513: Identifying JPT /SPT Blade (220 589 01 99 61)

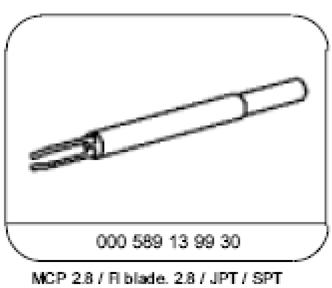


Fig. 514: Identifying MCP 2.8 / Fl Blade. 2.8 / JPT / SPT (000 589 13 99 30)

Secondary unlocking for version with locking bar (JPT)

1. Using a suitable tool, move locking bar (1) in direction of arrow out of locked position.

Shown on 4-pin JPT plug

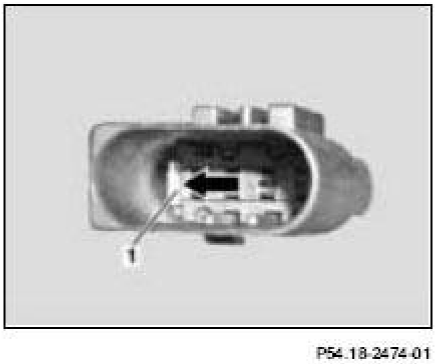


Fig. 515: Moving Locking Bar - Shown On 4-Pin JPT Plug

Secondary release on version with retaining cap (JPT)

1. Using a suitable tool, pry up the lock tab on the retaining cap (6).
2. Move the retaining cap (6) in direction of arrow until it reaches the stop.

Shown on 4/8-pin JPT/MQS plug

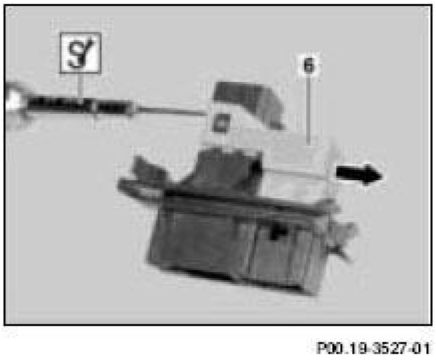


Fig. 516: Prying Up Lock Tab On Retaining Cap - Shown On 4/8-Pin JPT/MQS Plug

Secondary unlocking for version with lock tab

1. Insert suitable tool underneath locking tabs (1).
2. Pry up the locking tabs (1) in direction shown by arrow.

Shown on 4-pin JPT connector

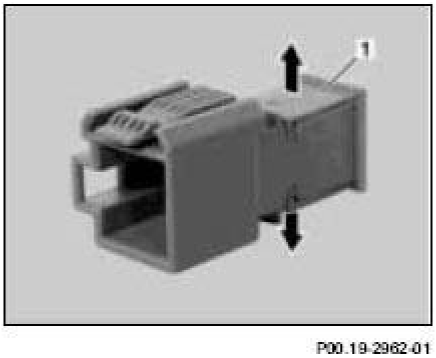


Fig. 517: Prying Up Locking Tabs - Shown On 4-Pin JPT Connector

Unpin contact pins form connector (JPT)

1. Insert blade holder with clamping pliers with JPT/SPT blade or MCP 2.8/Fl. 2.8/JPT/SPT blade from the front through the openings in contact cavity of connector housing (3).

   This results in the spring shackles of the contact pin (2) being compressed.

2. Remove contact pin (2) from connector housing (3) by gently pulling the relevant cable.

Shown on 4-pin JPT connector

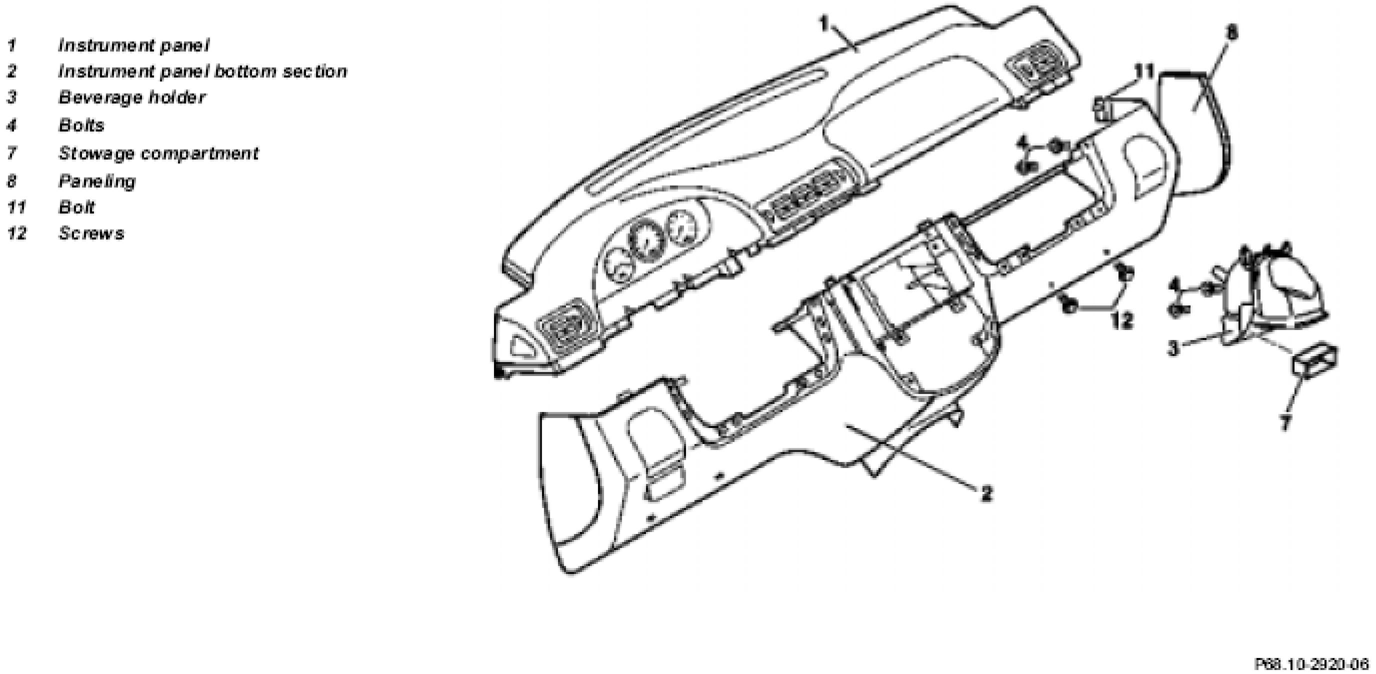
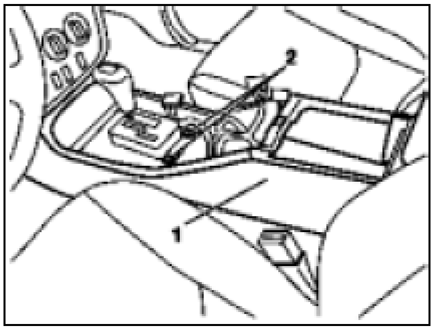


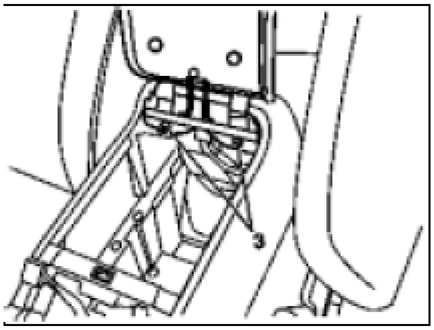
Fig. 518: Contact Pins From Connector (JPT) - Shown On 4-Pin JPT Connector

REMOVE CONTACTS FROM MULTI CONTACT POINT (MCP) COUPLING - AR00.19-P-0120-09A



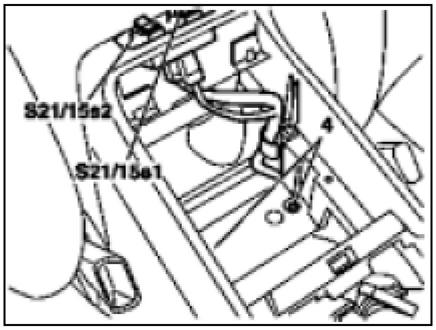
1	Housing
2	Screws

Fig. 519: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)



3	Screws
4	Screws

Fig. 520: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



S21/15s1	Left rear power window switch
S21/15s2	Right rear power window switch

Fig. 521: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

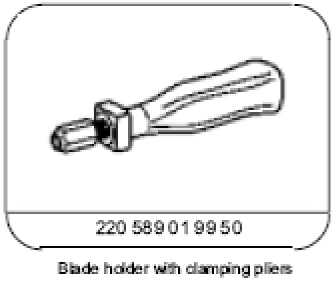


Fig. 522: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

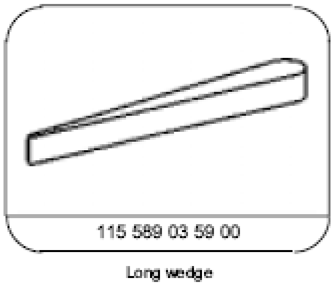


Fig. 523: Identifying MCP 2.8 / FL Blade. 2.8 (220 589 01 99 59)

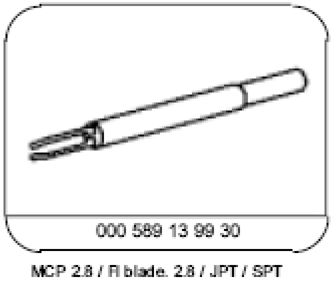


Fig. 524: Identifying MCP 2.8 / Fl Blade. 2.8 / JPT / SPT (000 589 13 99 30)

Secondary release on version with lock tab (MCP)

1. Using a suitable tool, lift locking shackles (1) in direction shown by arrow.

Shown on a 4-pin MCP coupling

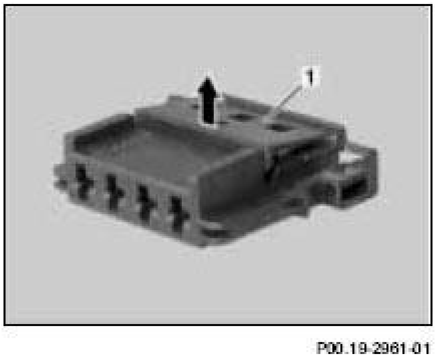


Fig. 525: Lifting Locking Shackles - Shown On A 4-Pin MCP Coupling

Secondary release on version with coupling cap (MCP)

1. Using a suitable tool (1), pry up lock tab (2) for coupling cap (4).
2. Pull clutch housing (3) from coupling cap (4) in direction shown by arrow.

Shown on a 3/3-pin MQS/MCP coupling

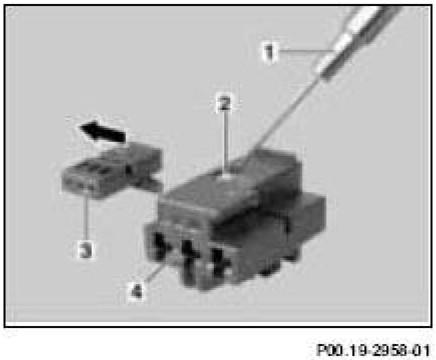


Fig. 526: Prying Up Lock Tab For Coupling Cap - Shown On A 3/3-Pin MQS/MCP Coupling

Secondary release on version with retaining cage (MCP)

1. Using a suitable tool (1), slide retaining cage (2) into pre-locking position in direction shown by arrow.

Shown on a 47-pin MQS or MCP coupling

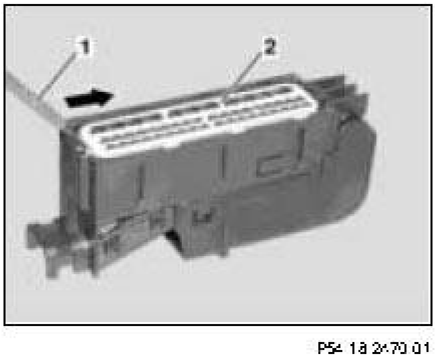


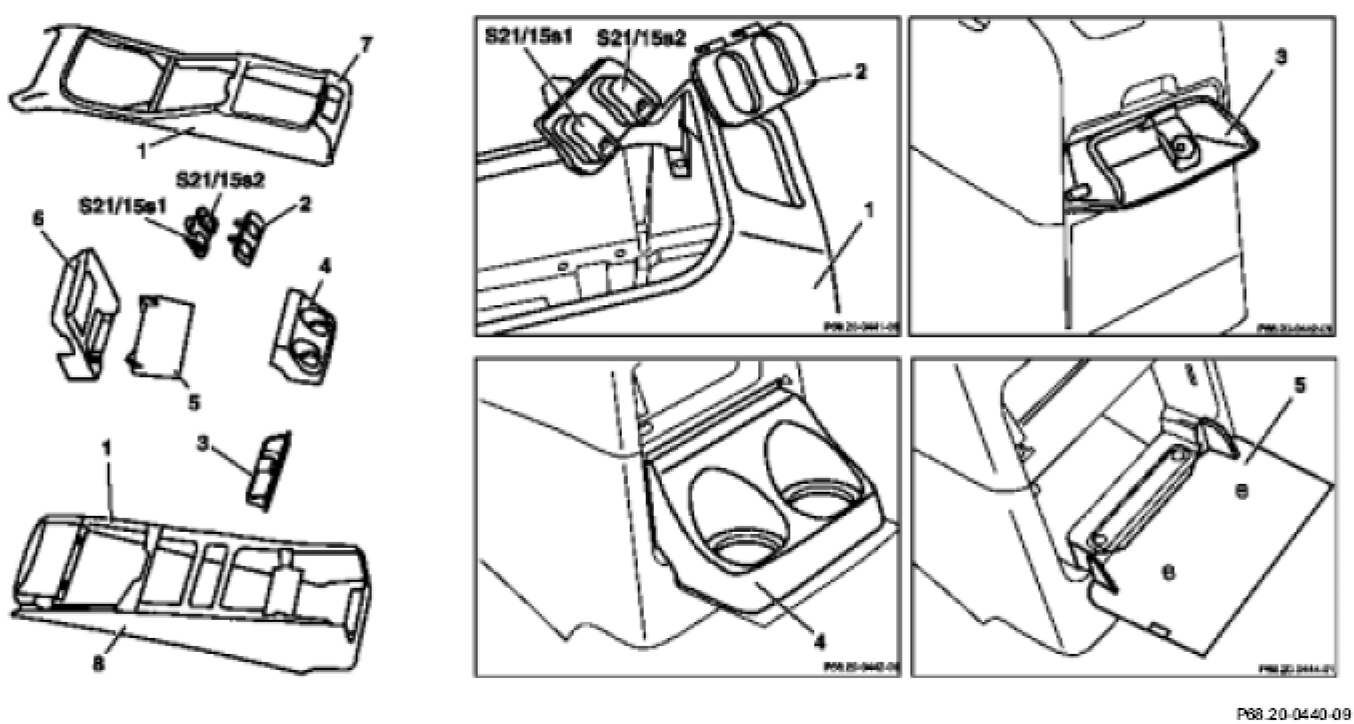
Fig. 527: Sliding Retaining Cage - Shown On A 47-Pin MQS Or MCP Coupling

Unpin female contacts from coupling (MCP)

1. Insert blade holder with clamping pliers and MCP 2.8/Fl blade 2.8 or MCP 2.8/Fl. 2.8/JPT/SPT blade from the front through the openings in the contact cavity of the coupling (1).

   This step compresses the spring shackles (2) on the female contact.

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling.



1	Center console.	5	Cover	S21/15s1	Left rear power window switch
2	Cover	6	Internal component	S21/15s2	Right rear power window switch
3	Ashtray housing	7	Center console upper section		
4	Beverage holder	8	Center console bottom section		

Fig. 528: Female Contacts From Coupling (MCP)

REMOVE CONTACTS FROM STANDARD POWER TIMER COUPLING - AR00.19-P-0120-10A

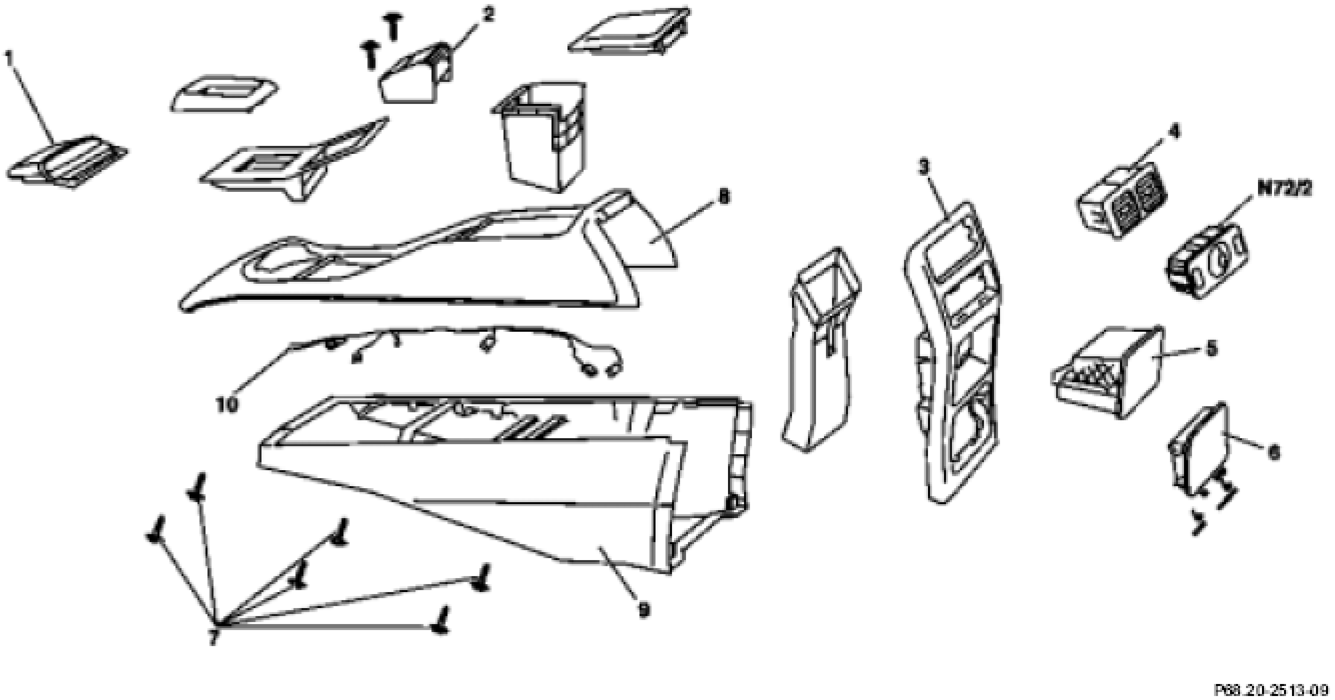


Fig. 529: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

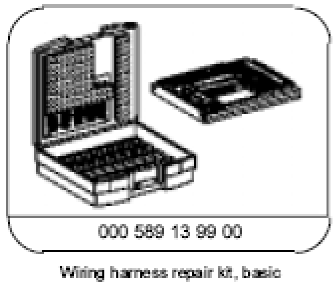


Fig. 530: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

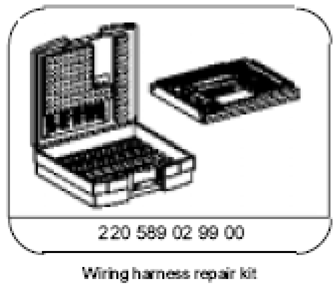
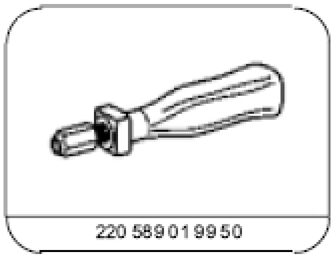
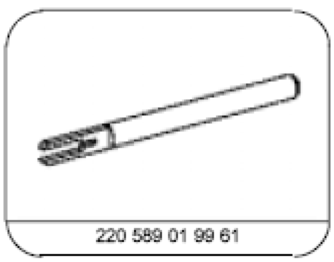


Fig. 531: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



Blade holder with clamping pliers

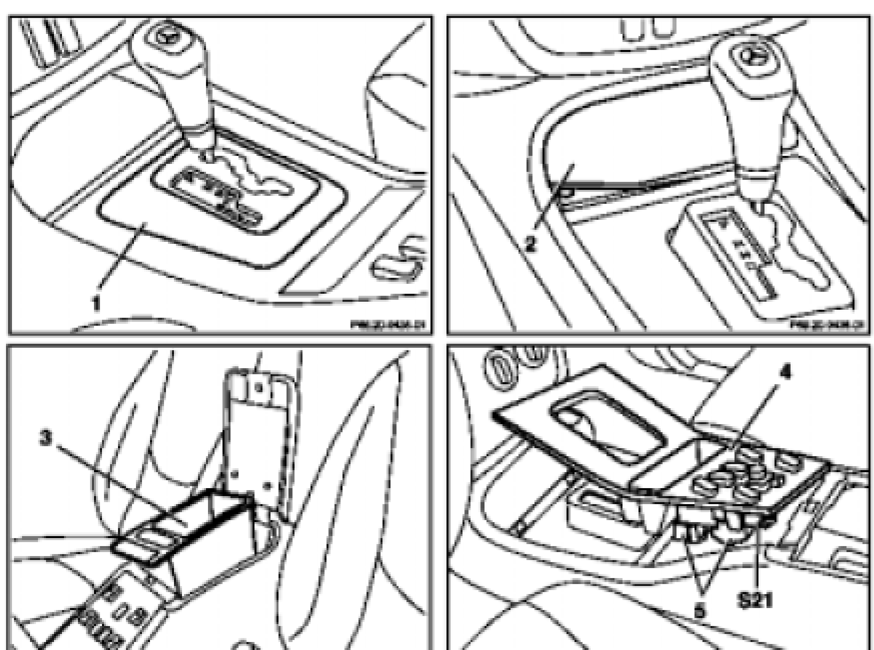
Fig. 532: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)



JPT / SPT blade

Fig. 533: Identifying JPT/ SPT Blade (220 589 01 99 61)

1	*Plastic frame*
2	*Covering in front stowage compartment*
3	*Center console insert*
4	*Cover*
5	*Connectors*
S21	*Center console switch group*



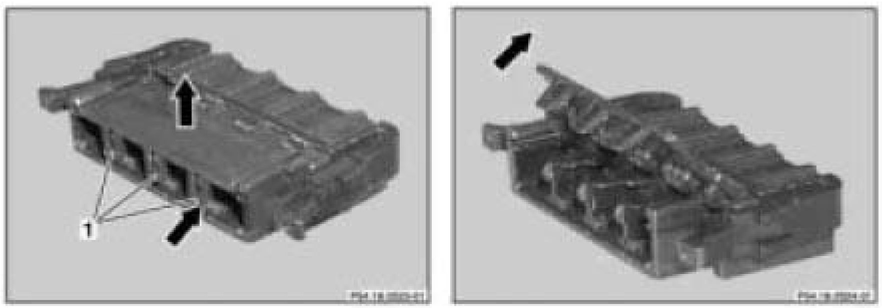
P68.20-0434-06

Fig. 534: Identifying MCP 2.8 / Fl Blade. 2.8 / JPT / SPT (000 589 13 99 30)

Secondary release on version with lock tab (SPT)

1. Using a suitable tool, at the line side unlock the lugs (1) on lock tab.
2. Open the tab.

Shown on a 4-pin SPT coupling



P54.18-2525-04

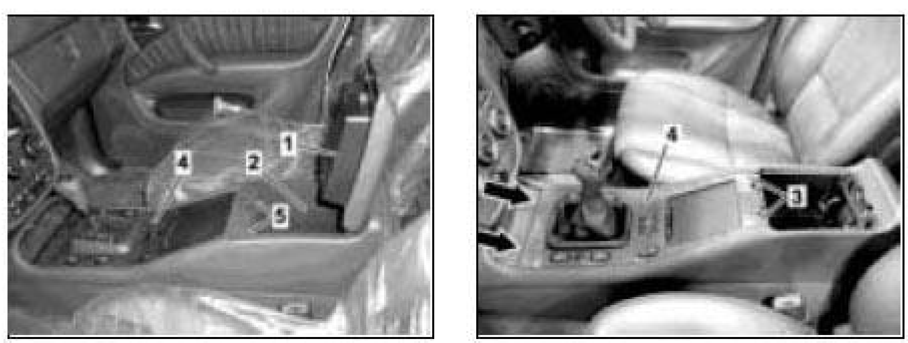
Fig. 535: Opening Tab - Shown On A 4-Pin SPT Coupling

Secondary release on version with spring (SPT)

1. Insert a suitable tool between spring (1) and housing and then press spring (1) out.

Shown on a 7-pin JPT and SPT coupling

1 Armrest cover
2 Stowage box
3 Bolts
4 Cover on shift lever
5 Plastic screws



P68.20-2545-01 P68.20-2456-01

Fig. 536: Pressing Spring Out - Shown On A 7-Pin JPT And SPT Coupling

Secondary release on version with slider (SPT)

1. Using a suitable tool, push the slider out of the last detent in direction shown by arrow.

   Press carefully using the tool so that the gasket at the slider is not damaged.

Shown on a 6-pin SPT coupling

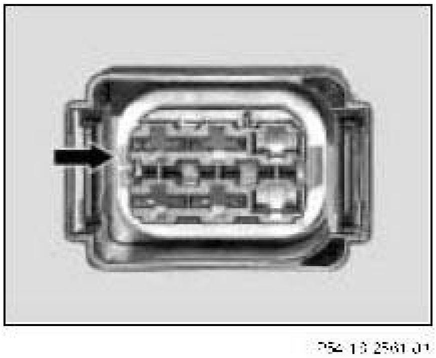


Fig. 537: Pushing Slider Out Of Last Detent - Shown On A 6-Pin SPT Coupling

Unpin female contacts from coupling (SPT)

1. Insert blade holder with clamping pliers with JPT/SPT blade or MCP 2.8/ Fl.2.8/JPT/SPT blade from the front through the openings in contact cavity of coupling (1).

   i This step compresses the spring shackles (2) on the female contact.

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling.

1 Stowage compartment
2 Screws
3 Stowage box
4 Screws
5 Armrest cover

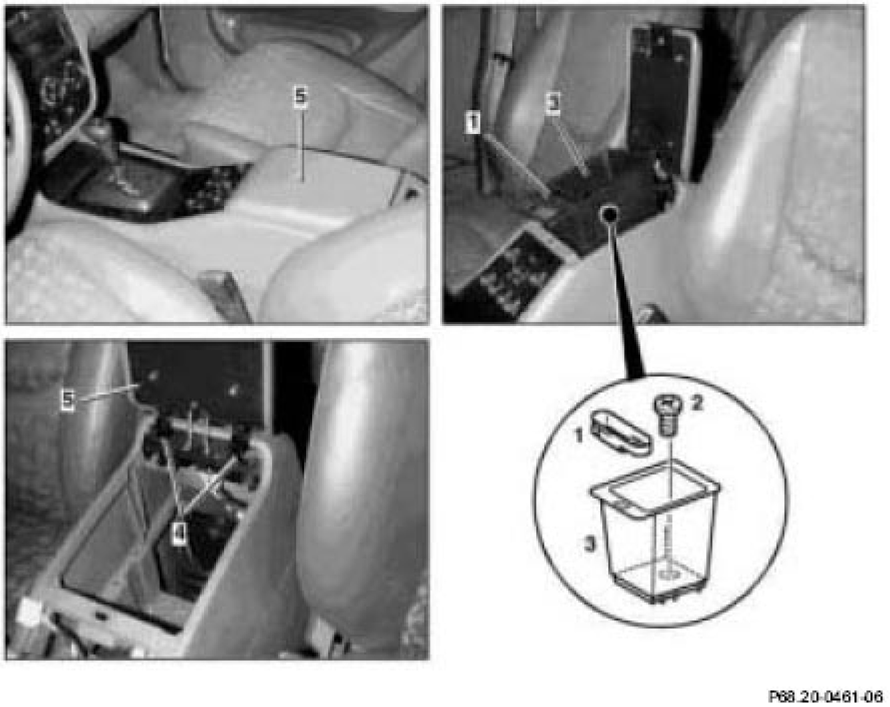


Fig. 538: Unpinning Female Contacts From Coupling (SPT)

REMOVE CONTACTS FROM SPADE-TYPE SENSOR CONTACT COUPLING - AR00.19-P-0120-12A

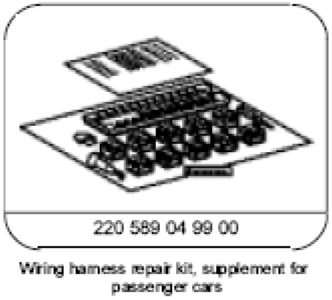


Fig. 539: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

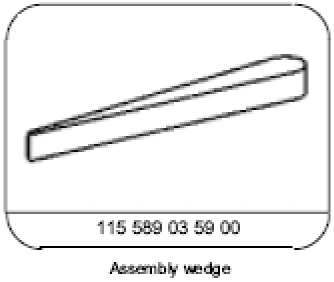


Fig. 540: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

1 *Cover on gearshift lever*
2 *Ashtray housing*

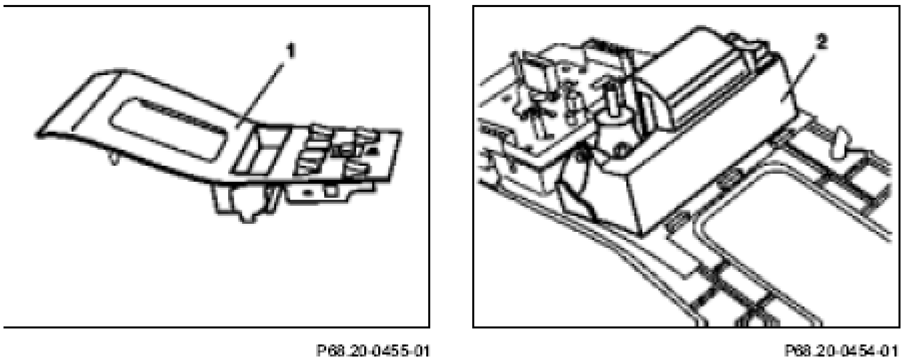


Fig. 541: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

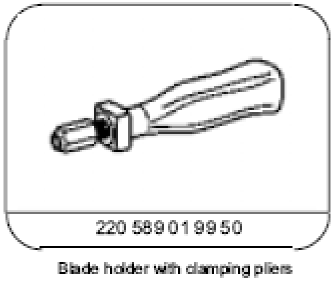


Fig. 542: Identifying Lade Holder With Clamping Pliers (220 589 01 99 50)

1 Belt end fitting for third seat row
2 Cargo retainers
3 Floor mat

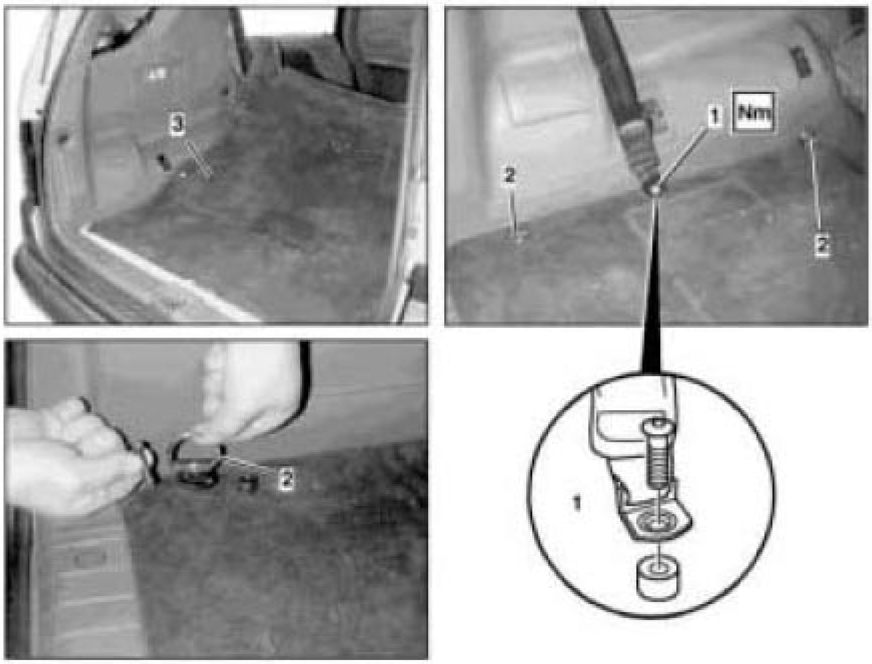


Fig. 543: Identifying LSK 8 Blade (220 589 01 99 56)

Secondary release on version with spring (LSK)

1. Insert a suitable tool between the spring and the housing.
2. Press out the spring.

Shown on a 4-pin LSK and JPT coupling

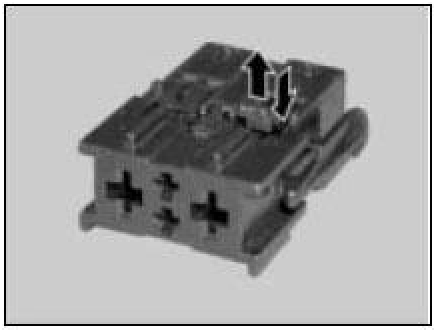


Fig. 544: Pressing Out Spring - Shown On A 4-Pin LSK And JPT Coupling

Secondary release on version with slide valve (LSK)

1. Push (1) slider out of locked position in direction of arrow.

Shown on a 6-pin LSK and JPT coupling

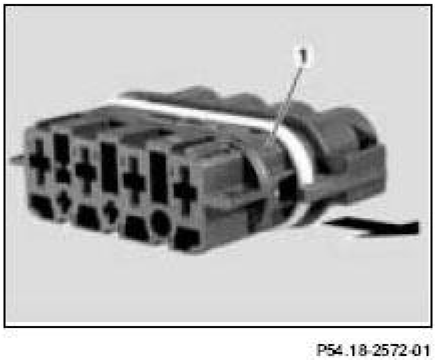


Fig. 545: Pushing Slider Out Of Locked Position - Shown On A 6-Pin LSK And JPT Coupling

Secondary release on version with-pin (LSK)

1. Using a suitable tool, push pin out of last detent in direction shown by arrow.

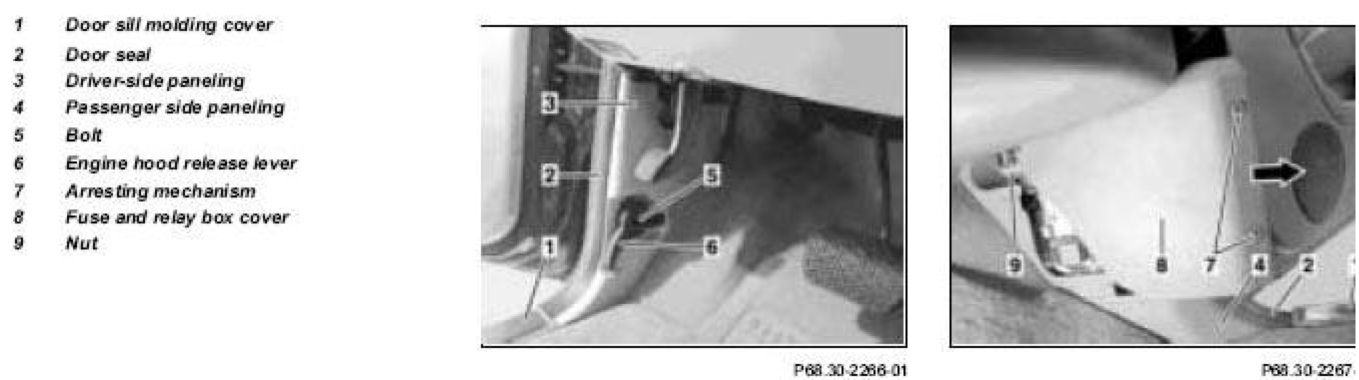


Fig. 546: Pushing Pin Out Of Last Detent

Unpin female contacts from coupling (LSK)

1. Insert blade holder with clamping pliers and LSK 8 blade from front end through the openings in coupling contact cavity (1).

   This step compresses the spring shackles (2) on the female contact.

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling.

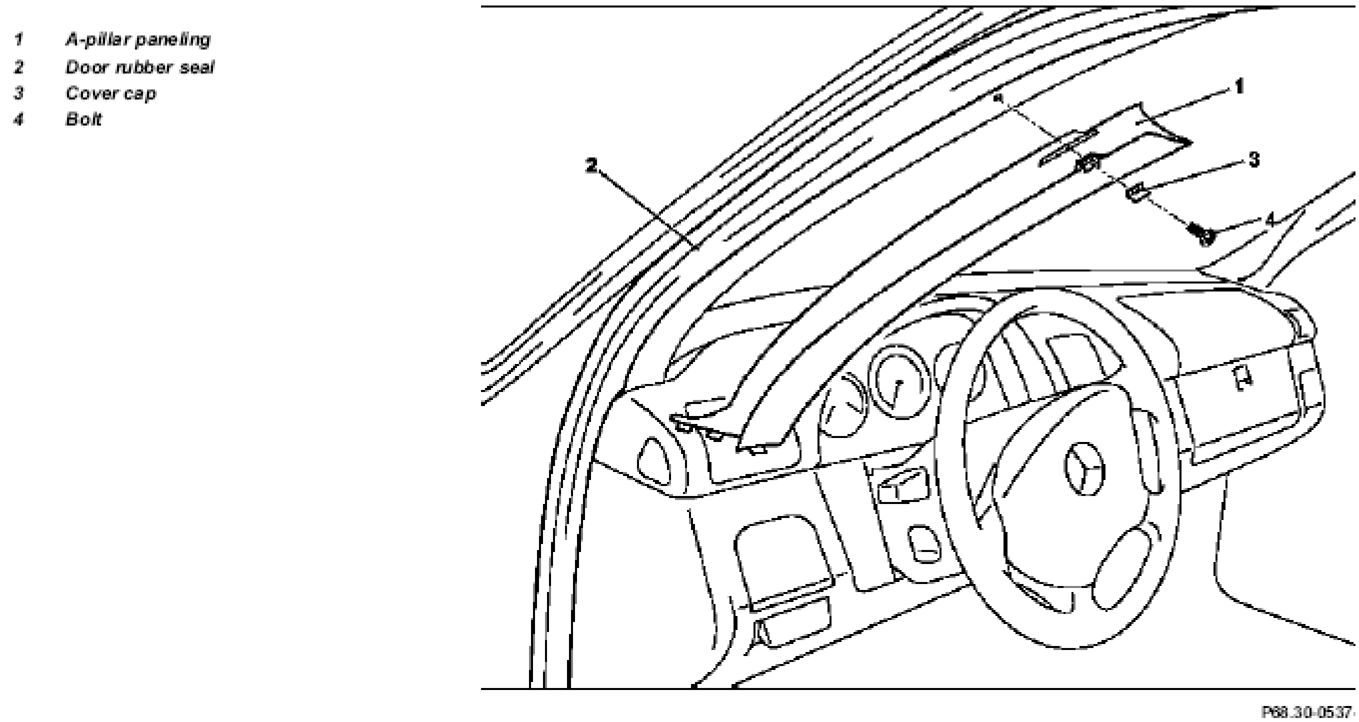


Fig. 547: Female Contacts From Coupling (LSK)

REMOVE CONTACTS FROM SPADE-TYPE SENSOR CONTACT PLUG - AR00.19-P-0120-13A

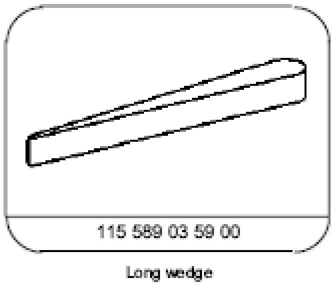


Fig. 548: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

1 Door sill molding
2 Cover
3 Bolt
4 Cover cap

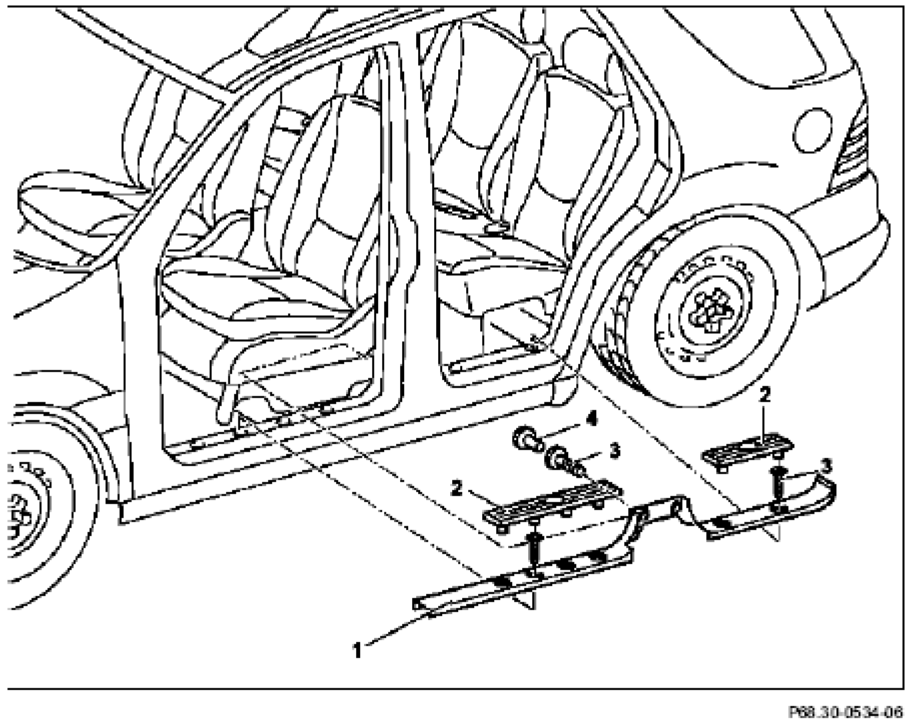


Fig. 549: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

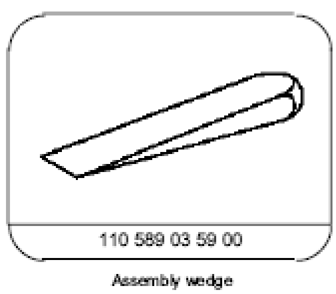


Fig. 550: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



Fig. 551: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

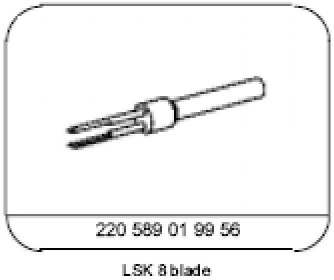
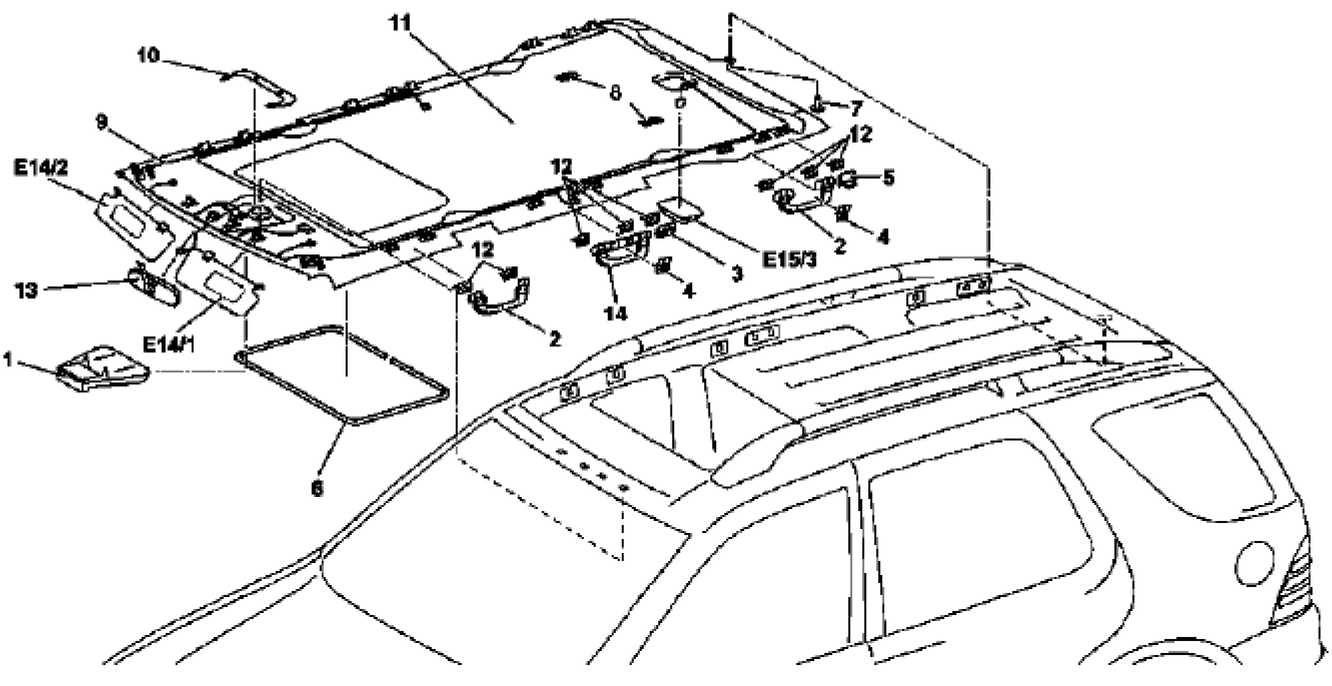


Fig. 552: Identifying LSK 8 Blade (220 589 01 99 56)

Secondary release on version with disk (LSK)

1. Using a suitable tool, push the disk out of the last detent in direction shown by arrow.

Shown on a 2-pin LSK plug



1	*Overhead control panel, front*	*9*	*Wiring harness*	*E14/1*	*Left sun visor with illuminated mirror*
2	*Roof frame handles*	*10*	*Mounting frame for headliner/ overhead control panel*	*E14/2*	*Right sun visor with illuminated mirror*
3	*Coat hook*	*11*	*Headliner*	*E15/3*	*Rear interior lamp*
4	*Cover for mounting points on cargo net*	*12*	*Shock absorber*		
5	*Bracket*	*13*	*Inside rearview mirror*		
6	*Edge guard for roof paneling on tilting/sliding roof cutout*	*14*	*Handle*		
7	*Plastic clip*				
8	*Velcro fastener*				

Fig. 553: Pushing Disk Out Of Last Detent - Shown On A 2-Pin LSK Plug

Unpin female contacts from plug (LSK)

1. Insert blade holder with clamping pliers and LSK 8 blade from front end through the openings in plug contact cavity (1).

   This step compresses the spring tabs (2) on the contact pin.

2. Now the pull line extending from contact-pin slightly to remove it from the back of the plug.

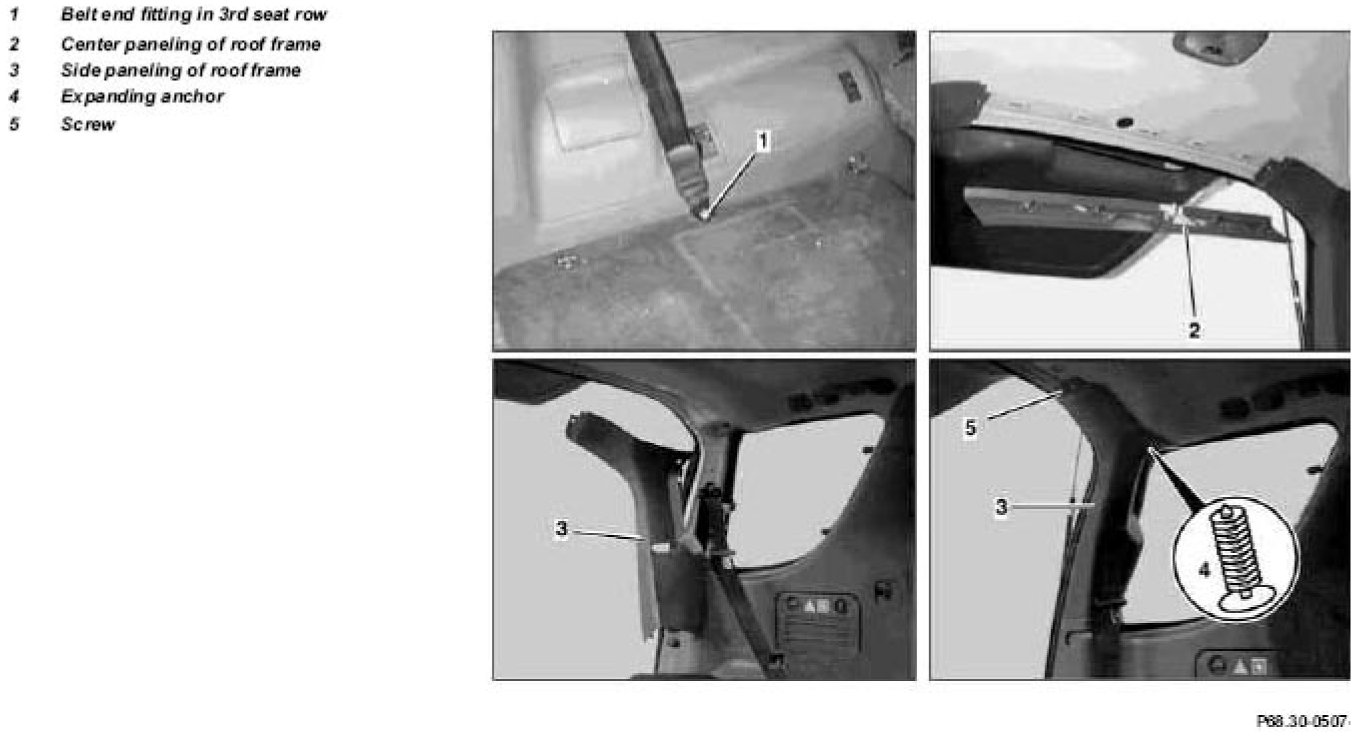


Fig. 554: Female Contact From Plug (LSK)

REMOVE CONTACTS FROM MAXI POWER TIMER COUPLING - AR00.19-P-0120-14A

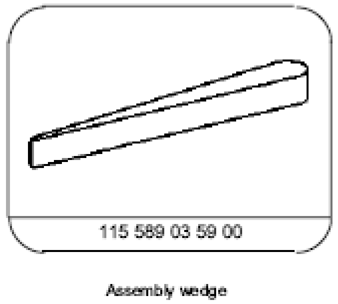
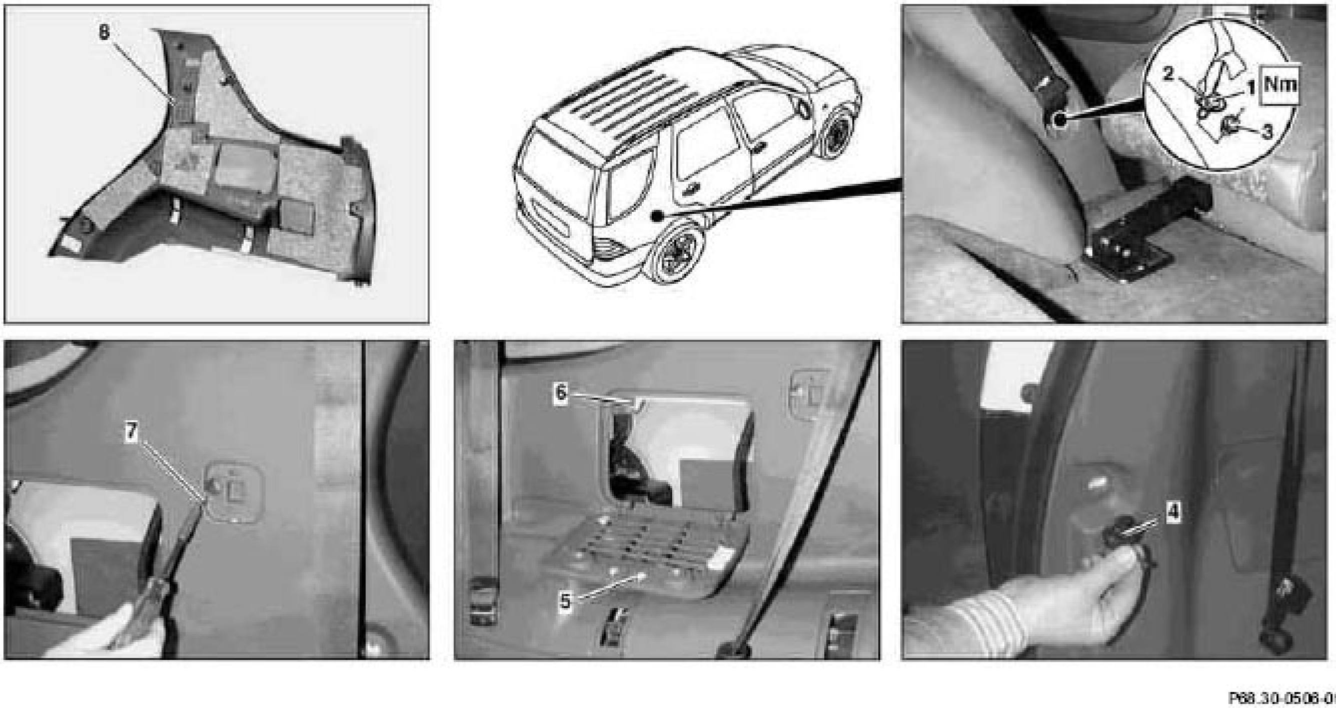


Fig. 555: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)



1	Screw	4	Bracket	7	Screw
2	Belt end fitting	5	Cover	8	Paneling
3	Distance sleeve	6	Screw		

Fig. 556: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

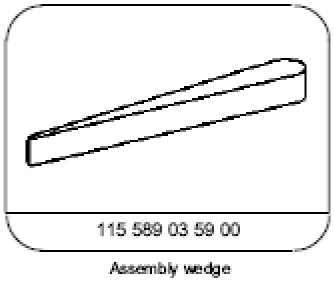


Fig. 557: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

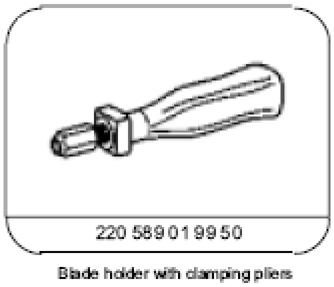
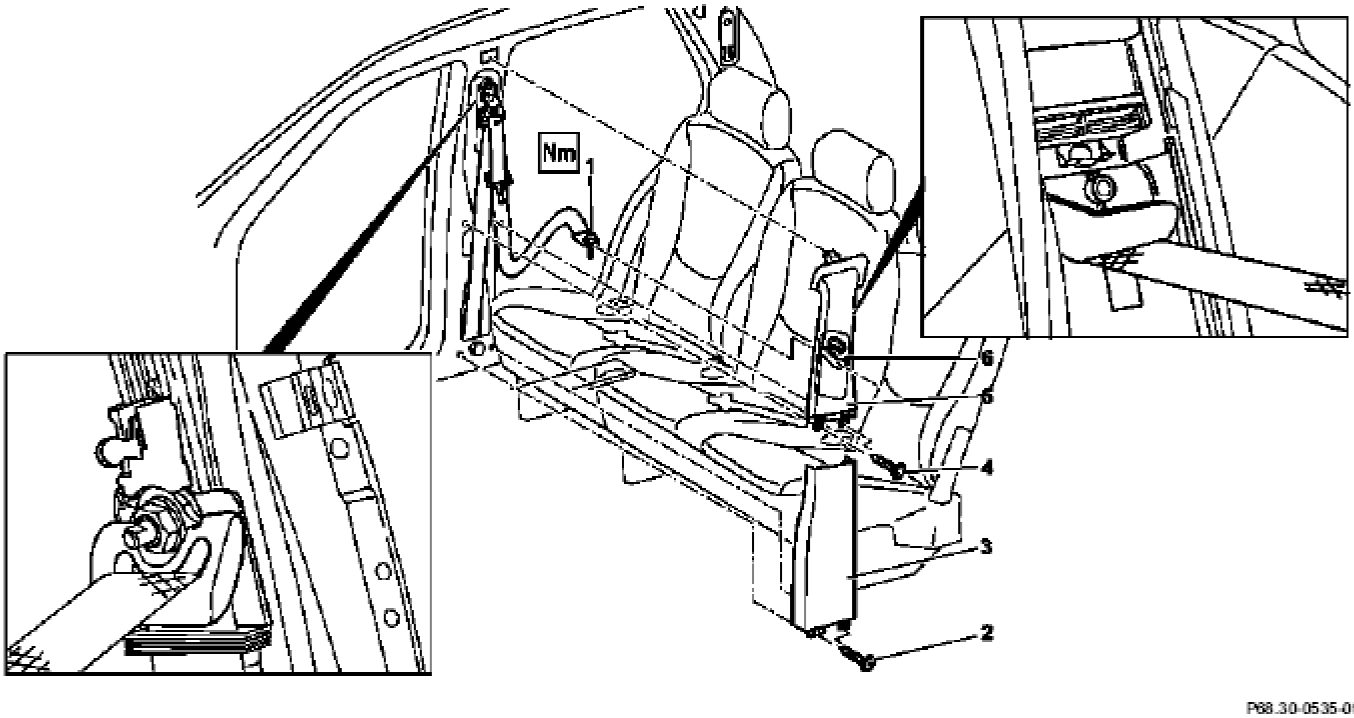


Fig. 558: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)



1	*Belt end fitting bolt*	3	*Bottom paneling*	5	*Top trim panel*
2	*Sheet metal screw*	4	*Sheet metal screw*	6	*Seat belt height adjuster*

Fig. 559: Identifying MPT Blade (220 589 01 99 51)

Secondary release on version with retaining cap (MPT)

1. Using a suitable tool, pry up the lock tabs on the retaining cap (1).
2. Pull the retaining cap from the clutch housing (2).

Shown on a 4-pin MPT and JPT coupling

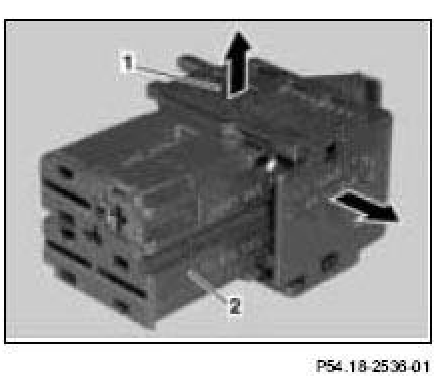


Fig. 560: Pulling Retaining Cap From Clutch Housing - Shown On A 4-Pin MPT And JPT Coupling

Unpin female contacts from coupling (MPT)

1. Insert blade holder with clamping pliers and MPT blade from front end through the openings in coupling contact cavity (1).

   This step compresses the spring shackles (2) on the female contact.

2. A slight tug on the corresponding cable will remove the female contact (1) from the coupling.

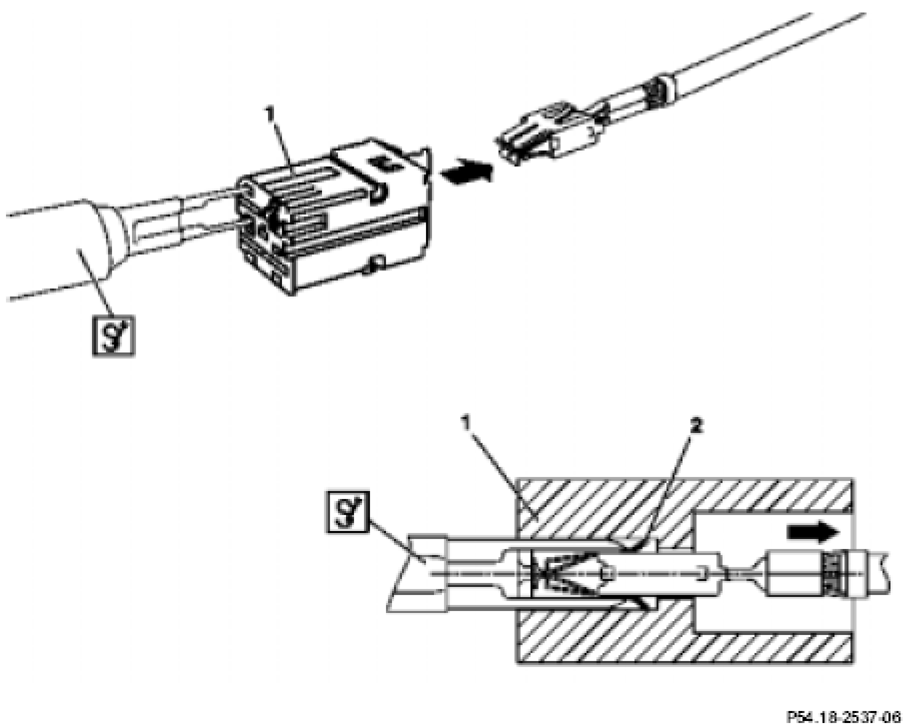


Fig. 561: Female Contacts From Coupling (MPT)

REMOVE CONTACTS FROM 2.5 ROUND PLUG CONTACT COUPLING - AR00.19-P-0120-15A

1	Sun visor mount
2	Screws
3	Roof frame grab handle
4	Roof wiring harness
5	A-pillar paneling
6	Headliner
E14/1	Left sun visor with illuminated mirror
E14/2	Right sun visor with illuminated mirror
E14/1x1	Left mirror illumination connector
E14/2x1	Right mirror illumination connector

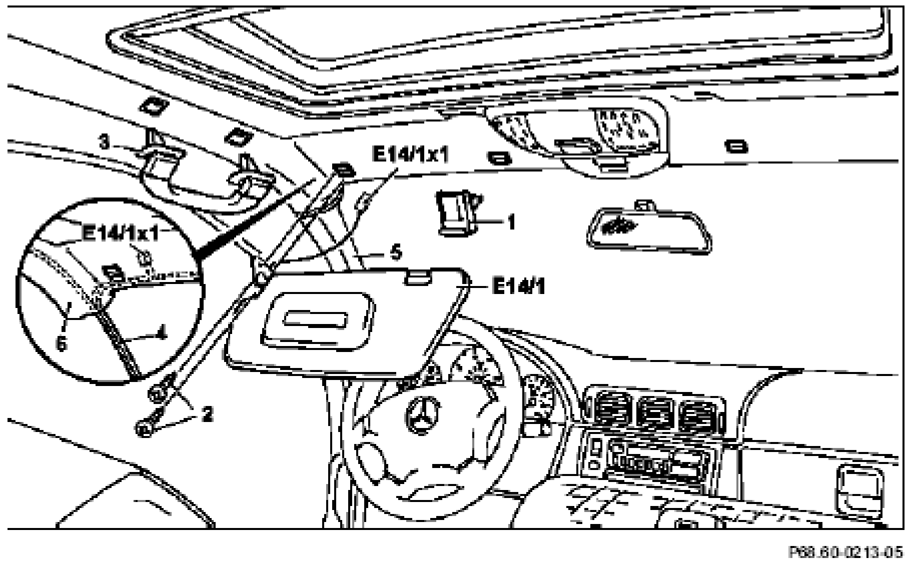


Fig. 562: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)



Fig. 563: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

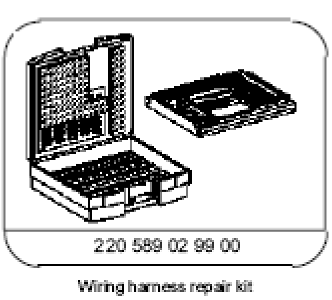


Fig. 564: Identifying Wiring Harness Repair Kit (220 589 01 99 30)

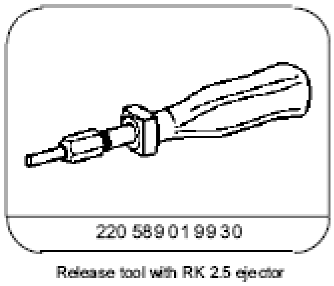


Fig. 565: Identifying Release Tool With RK 2.5 Ejector (220 589 01 99 30)

Secondary release on version with locking slide valve (RK 2.5)

1. Using a suitable tool (1), push the locking slide valve (2) out of the last detent in direction shown by arrow.

Shown on a 15-pin RK 2.5 coupling

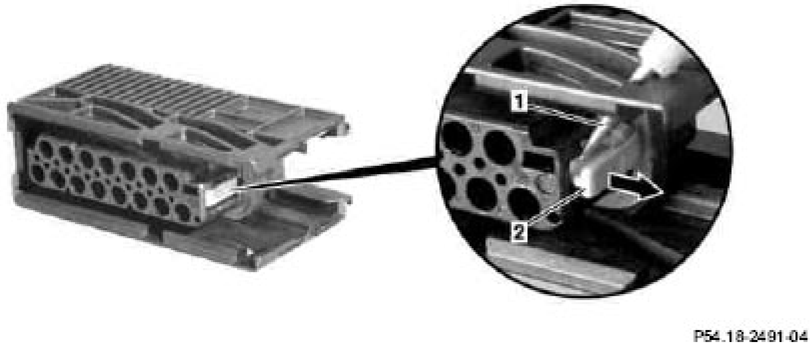


Fig. 566: Pushing Locking Slide Valve Out Of Last Detent - Shown On A 15-Pin RK 2.5 Coupling

Secondary release on version with slide valve (RK 2.5)

1. Using a suitable tool (1), push the slide valve (2) out of the last detent in direction shown by arrow.

Shown on a 1-pin RK 2.5 coupling

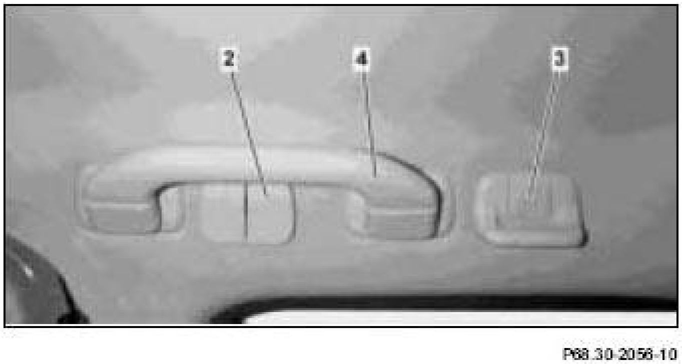


Fig. 567: Pushing Slide Valve Out Of Last Detent - Shown On A 1-Pin RK 2.5 Coupling

Secondary release on version with lock tab (RK 2.5)

1. Using a suitable tool (1), open the lock tab (2) in direction shown by arrow.

Shown on a 2-pin RK 2.5 coupling



Fig. 568: Opening Lock Tab - Shown On A 2-Pin RK 2.5 Coupling

Secondary release on version with secondary contact retainer (RK 2.5)

1. Move contact fuse (1) into pre-locking position using a suitable tool.

Shown on a 12-pin RK 2.5 coupling

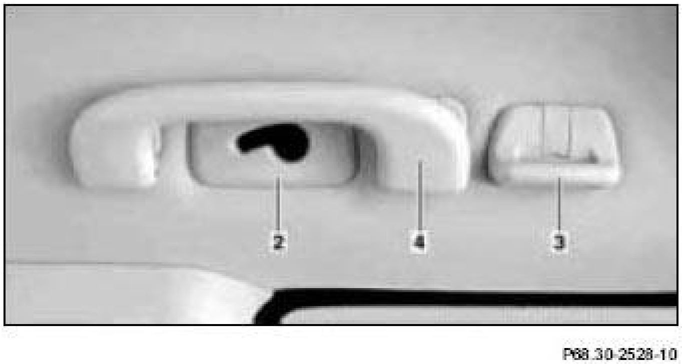


Fig. 569: Moving Contact Fuse - Shown On A 12-Pin RK 2.5 Coupling

Unpin female contacts from coupling (RK 2.5)

1. Insert release tool with RK 2.5 ejector into the contact cavity of the coupling (1) from the front end.

   i In this step, the sleeve (4) of the tool compresses the spring shackles on the female contact (2).

2. By means of the plunger (3) of the release tool with RK 2.5 ejector , press the contact pin (2) against the spring force of the tool out of the housing seat.

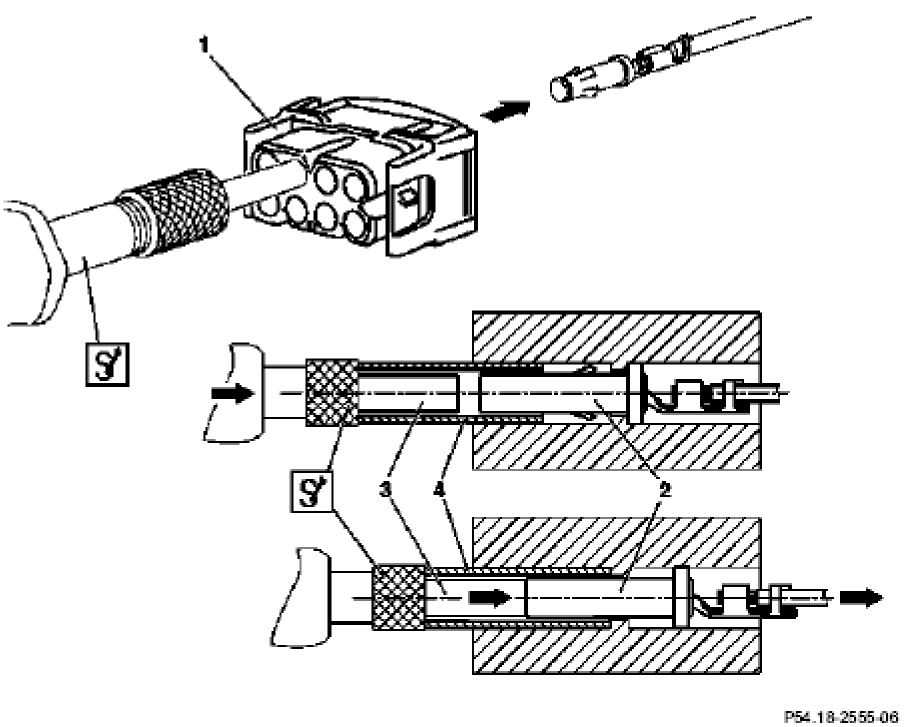


Fig. 570: Female Contacts From Coupling (RK 2.5)

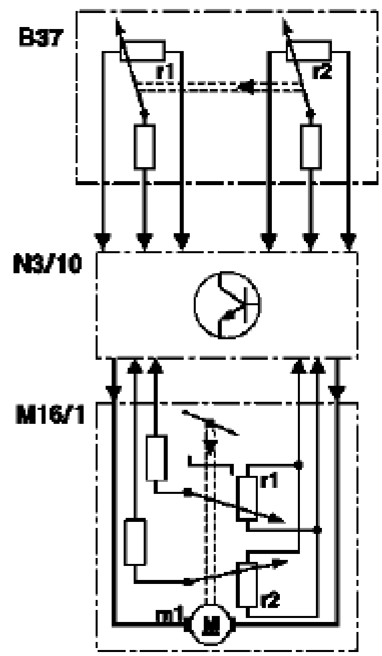
3. Gently pull the respective line to remove the female contact (2) from the coupling (1).

REMOVE CONTACTS FROM 2.5 ROUND PLUG CONTACT PLUG - AR00.19-P-0120-16A

B37 *Accelerator pedal sensor*
R1 Set value potentiometer 1 (or Hall sensor 1)
r2 Set value potentiometer 2 (or Hall sensor 2)

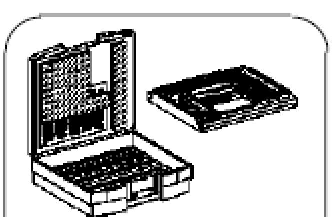
M16/1 *EA/CC/ISC [EFP/TPM/LLR] actuator*
(other designation: M16/6 throttle valve actuator)
M1 Actuator motor
r1 Actual value potentiometer 1
r2 Actual value potentiometer 2

N3/10 *ME-SFI control unit*



P30.20-0217-06

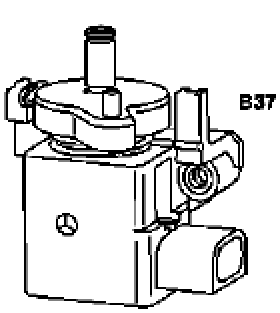
Fig. 571: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)



000 589 13 99 00

Wiring harness repair kit, basic

Fig. 572: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



B37 Pedal value sensor
(with Hall principle)

P30.20-0241-01

Fig. 573: Identifying Wiring Harness Repair Kit (220 589 01 99 30)

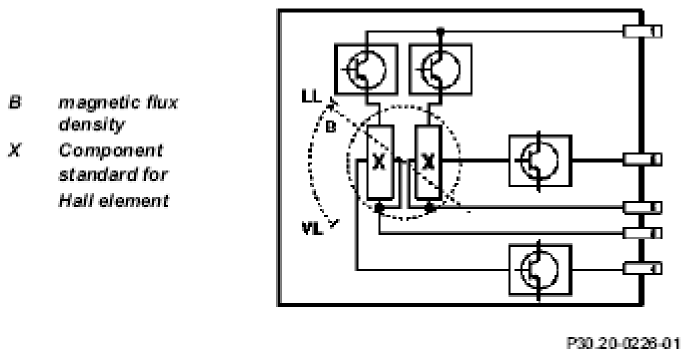


Fig. 574: Identifying Release Tool With RK 2.5 Ejector (220 589 01 99 30)

Secondary release on version with slide valve (RK 2.5)

1. Using a suitable tool (1), push the slide valve (2) out of the last detent in direction shown by arrow.

Shown on a 1-pin RK 2.5 plug

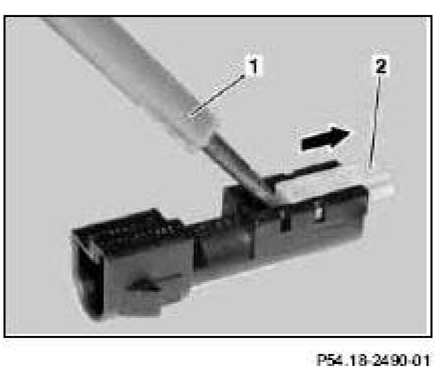
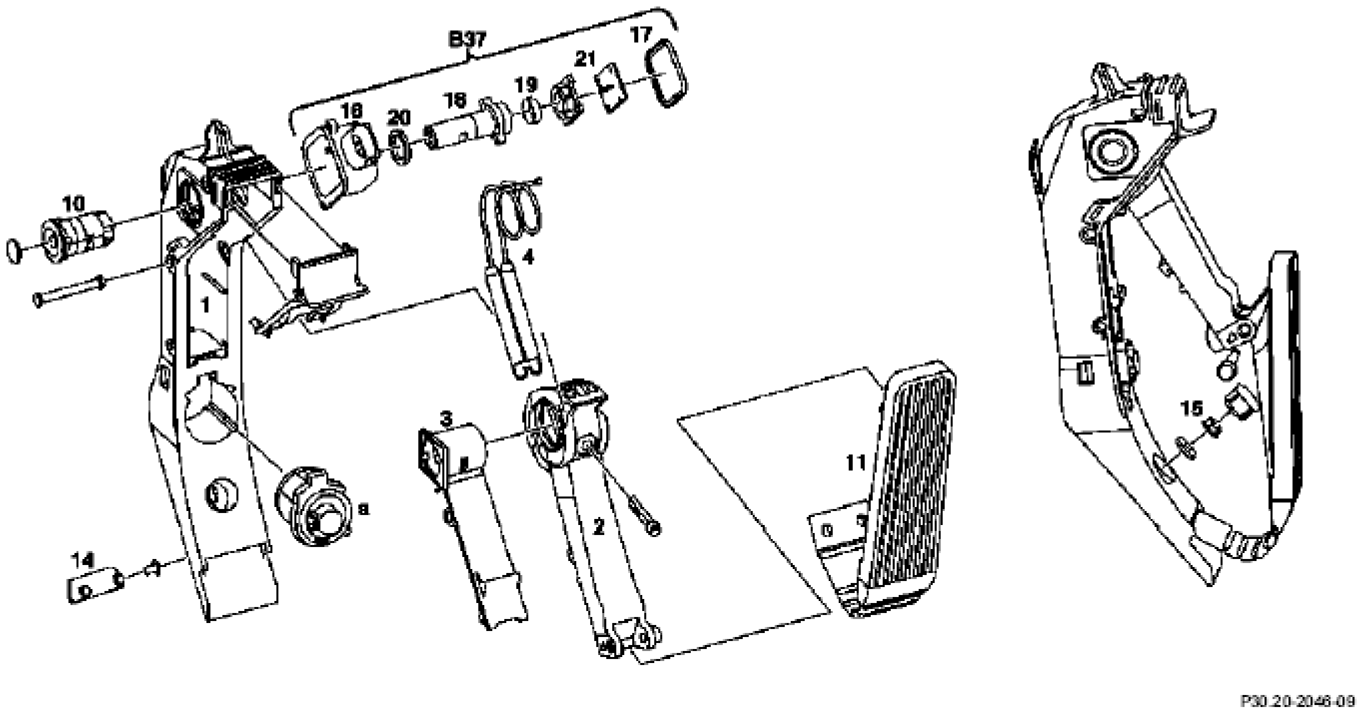


Fig. 575: Pushing Slide Valve - Shown On A 1-Pin RK 2.5 Plug

Secondary release on version with contact retainer (RK 2.5)

1. Using a suitable tool (1), open the contact retainer (2).

Shown on a 2-pin RK 2.5 plug



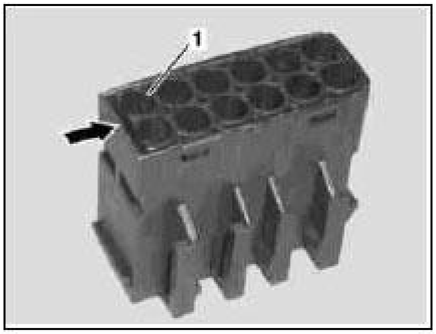
1	Base plate	15	Cap	B37	Accelerator pedal sensor
2	Pedal lever	16	Housing of pedal value sensor	S16/6	Kickdown switch (up to 7/02)
3	Friction ring	17	Cover	A	Kickdown simulator
4	Friction cables with spring	18	Shaft with magnet mount		
10	Spline shaft	19	Ring magnet		
11	Accelerator pedal	20	Sealing ring		
14	Detent plate for attaching accelerator pedal	21	Printed circuit board with stator and Hall electronics		

Fig. 576: Opening Contact Retainer - Shown On A 2-Pin RK 2.5 Plug

Secondary release on version with secondary retainer (RK 2.5)

1. Using a suitable tool, slide the secondary retainer (1) to the pre-locking position.

Shown on a 12-pin RK 2.5 plug



P54.18-2480-01

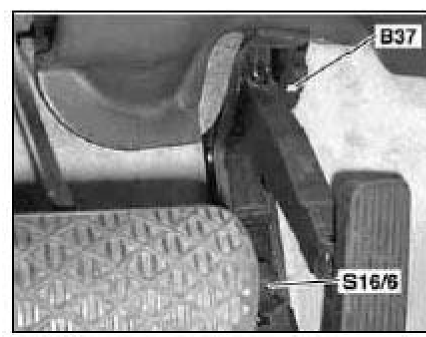
Fig. 577: Locating Secondary Retainer - Shown On A 12-Pin RK 2.5 Plug

Secondary release on version with lock tab (RK 2.5)

1. Using a suitable tool, slide the lock tab to the pre-locking position.

   Shown on an 8-pin RK 2.5 plug

B37 Accelerator pedal sensor (advanced designation; pedal value sensor)



P30.20-2012-01

Fig. 578: Sliding Lock Tab - Shown On An 8-Pin RK 2.5 Plug

Unpin contact pins from the plug (RK 2.5)

1. Insert release tool with RK 2.5 ejector into the contact cavity of the plug (1) from the front end.

   i In this step, the sleeve (4) of the release tool compresses the spring shackles on the contact-pin (2).

2. Press the plunger (3) on the release tool with RK 2.5 ejector to apply spring pressure to force the contact pin (2) from its seat in the connector housing.

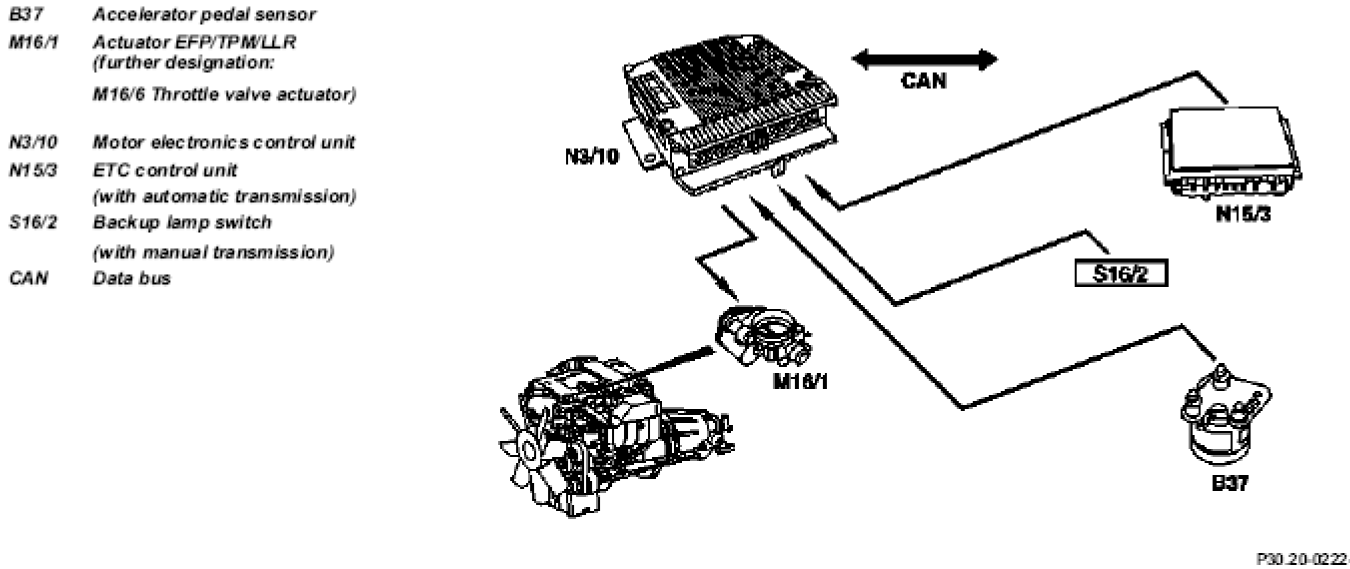


Fig. 579: Contact Pins From Plug (RK 2.5)

3. Gently pull the respective line to remove the contact pin (2) from the plug (1).

REMOVE CONTACTS FROM 2.5 SOLDER CONTACT COUPLING ROUND PLUG CONTACT - AR00.19-P-0120-17A

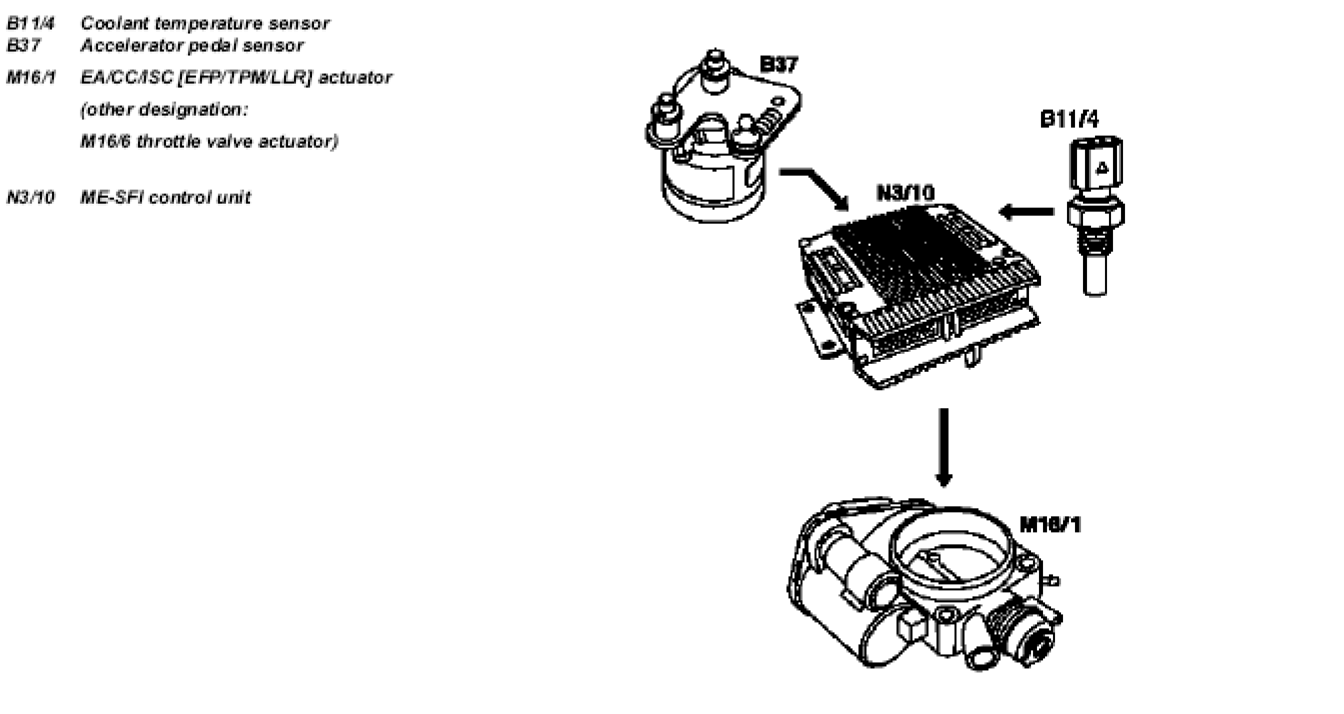
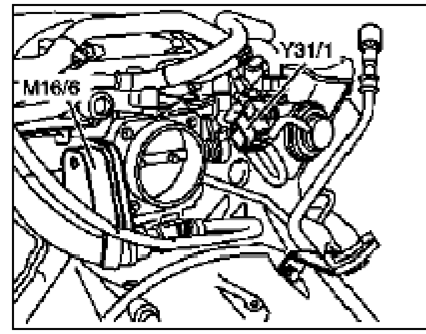


Fig. 580: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

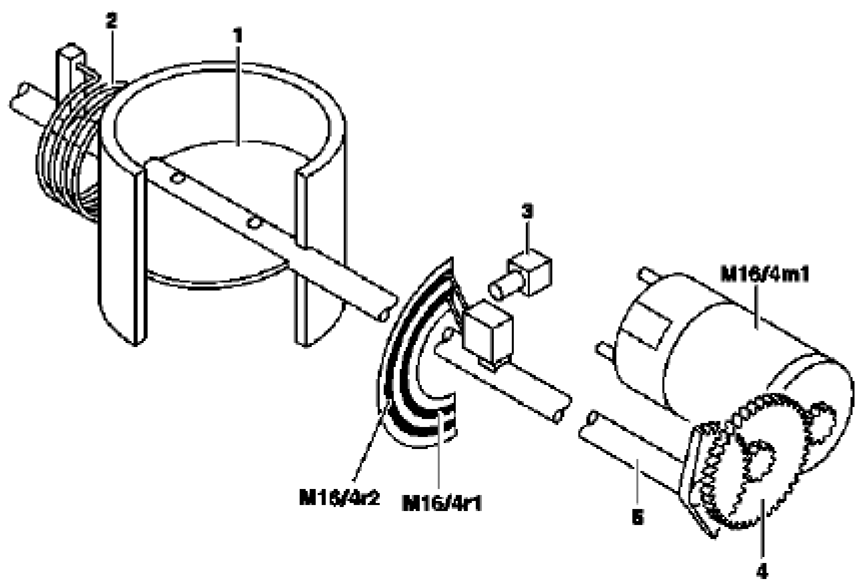
M16/6	Throttle valve actuator



P07.61-0455-01

Fig. 581: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

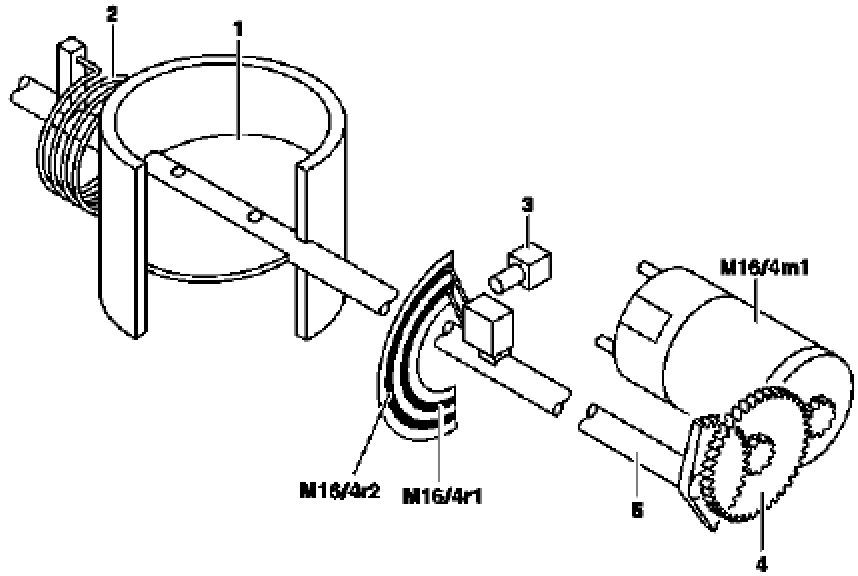
1	Throttle valve
2	Return spring
3	Spring capsule (mechanical stop)
4	Transmission
5	Throttle valve drive shaft
M16/4m1	Actuator motor
M16/4r1	Throttle valve actual value potentiometer 1 Throttle valve
M16/4r2	actual value potentiometer 2 Throttle valve



P30.20-0211-06

Fig. 582: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

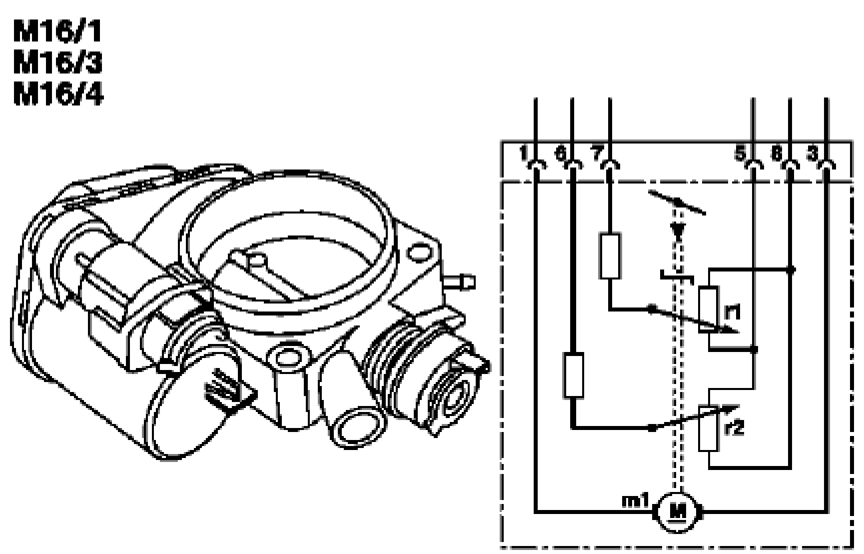
1 Throttle valve
2 Return spring 3 Spring capsule (mechanical stop)
4 Transmission
5 Drive shaft throttle valve
M16/4 m1Actuator motor
M16/4r1 Actual value potentiometer 1 Throttle valve
M16/4r2 Actual value potentiometer 2 Throttle valve



P30.20-0211-06

Fig. 583: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

M16/1 EA/CC/ISC [EFP/TPM/LLR] actuator
M16/3 Right EA/CC/ISC actuator Position on left of engine (M120)
M16/4 Left EA/CC/ISC actuator Position on right of engine (M120)
(additional designation: M16/6 throttle valve actuator)



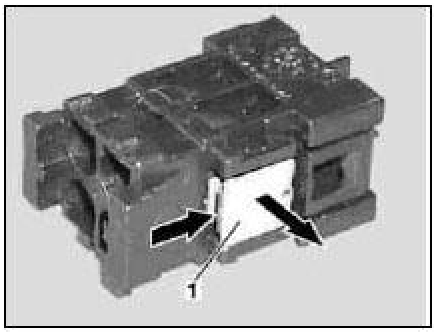
P07.60-0231-06

Fig. 584: Identifying RK 2.5 Blade Solder Contact (220 589 01 99 53)

Secondary release on version with slide valve (RK 2.5 solder contact)

1. Insert a suitable tool under the slide valve cap (1).
2. Using a suitable tool, press the slide valve out of the last detent in direction shown by arrow.

Shown on a 4-pin RK 2.5 solder contact coupling



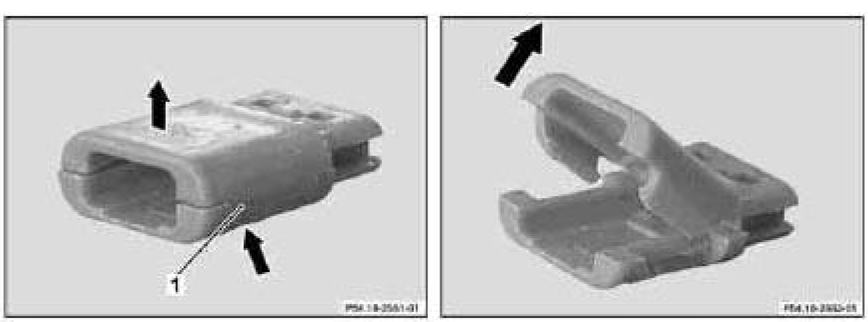
P54.18-2539-01

Fig. 585: Pressing Slide Valve Out Of Last Detent - Shown On A 4-Pin RK 2.5 Solder Contact Coupling

Secondary release on version with retaining clamp (RK 2.5 solder contact)

1. Using a suitable tool, pry up the side clips of the retaining clamp (1).
2. Open the retaining bracket (1) in direction shown by arrow.

Shown on a 2-pin RK 2.5 solder contact coupling



P54.18-2540-04

Fig. 586: Opening Retaining Bracket - Shown On A 2-Pin RK 2.5 Solder Contact Coupling

Unpin contact from coupling (RK 2, 5 solder contact)

1. Insert blade holder with clamping pliers and blade for RK 2.5 solder contact from the back side into the cable duct of the coupling.

   Align the sleeve of the blade for RK 2.5 solder contact with the spring shackle (1) in the coupling. This step presses the spring shackle (1) in the coupling into position.

2. Now gently pull the female contact, together with the blade holder, with clamping pliers and blade for RK 2.5 solder contact to remove them from the back of the coupling.

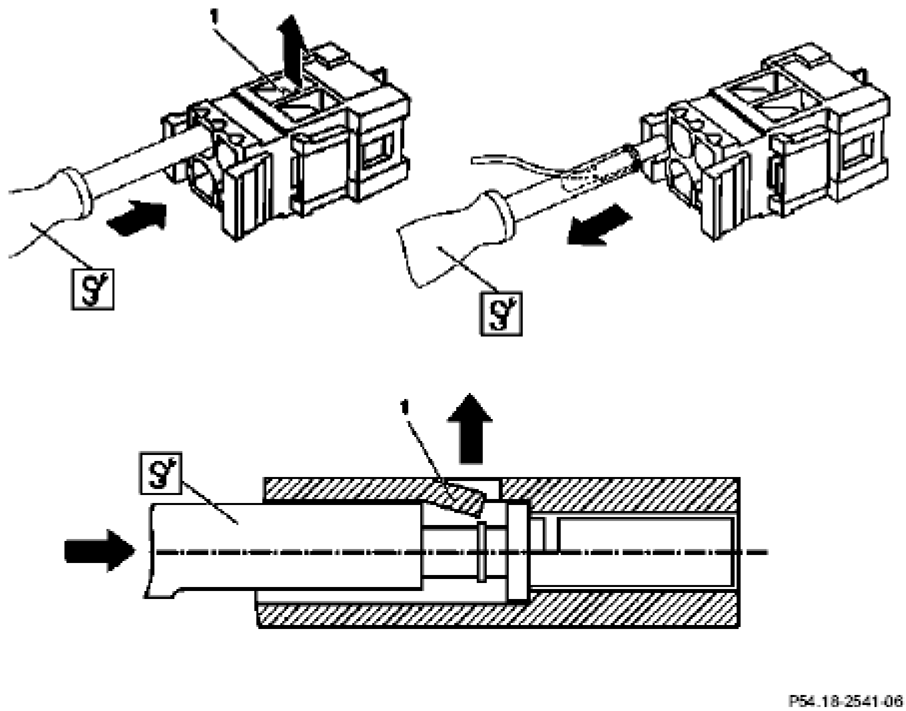
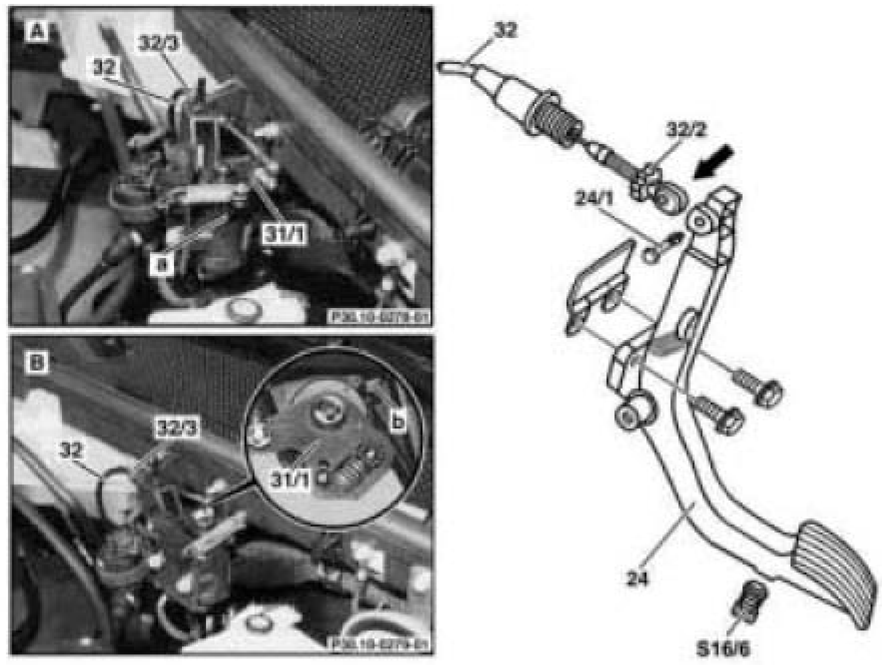


Fig. 587: Contact From Coupling (RK 2, 5 Solder Contact)

REMOVE CONTACTS FROM 2.5 SOLDER CONTACT PLUG ROUND PLUG CONTACT - AR00.19-P-0120-18A

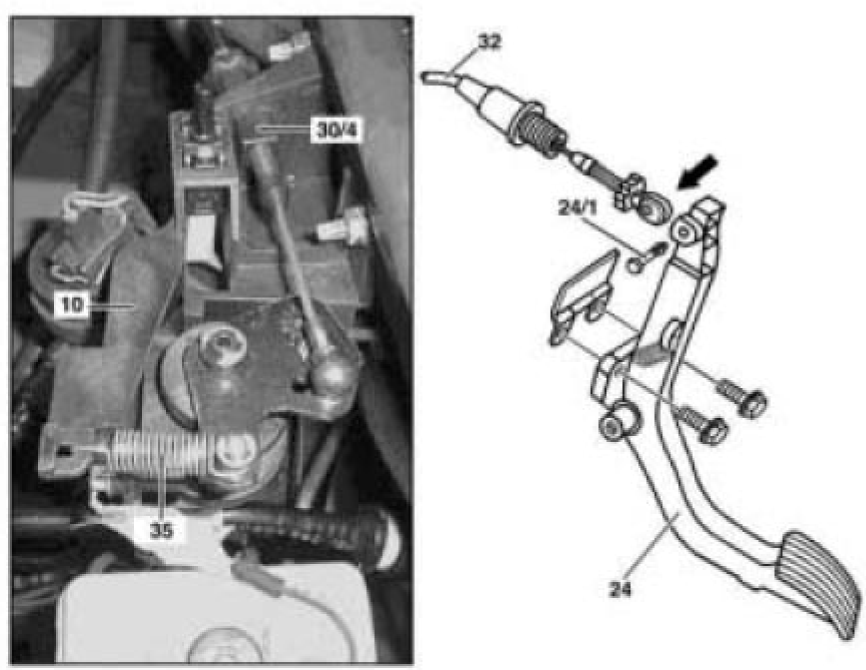
24	*Accelerator pedal*
31/1	*Relay lever position sensor*
32	*Control cable*
32/2	*Adjusting bolt*
32/3	*Adjusting bolt*
A	*Idle speed*
B	*Full throttle*
S16/6	*Kickdown switch*



P30.10-0286-06

Fig. 588: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

10	*Fixed lever*
24	*Accelerator pedal*
24/1	*Expanding wedge pin*
30/4	*Plastic clip*
32	*Control cable*
35	*Retracting spring*
Arrow	*control cable holder*



P30.10-0283-06

Fig. 589: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

24	Accelerator pedal
24/1	Expanding wedge pin
24/4	Retracting spring of accelerator pedal
30	Control cable
34	Firewall pivot point
34/2	Bolts
34/3	Locking plate

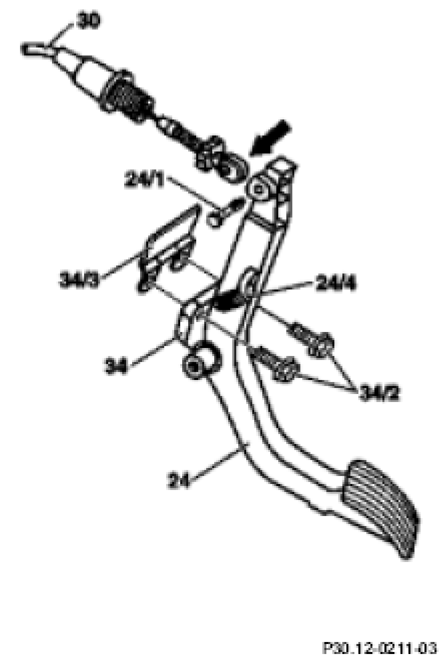


Fig. 590: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

1/2	Crankcase ventilation line
8/1	Bolts
8/2	O-ring
19	Intake manifold
M16/6	Throttle valve actuator
Arrow:	Plug connection

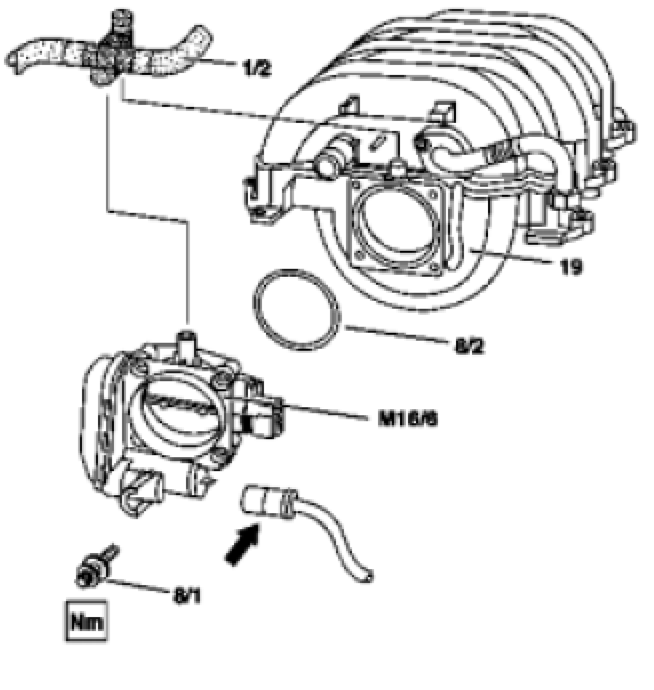


Fig. 591: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

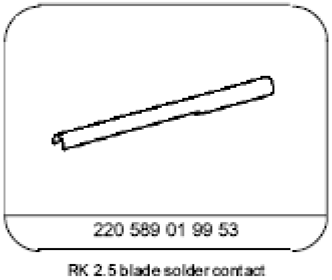


Fig. 592: Identifying RK 2.5 Blade Solder Contact (220 589 01 99 53)

Secondary release on version with slide valve (RK 2.5 solder contact)

1. Insert a suitable tool under the slide valve cap (1) and press the slide valve out of the last detent in direction shown by arrow.

   Shown on a 4-pin RK 2.5 solder contact plug

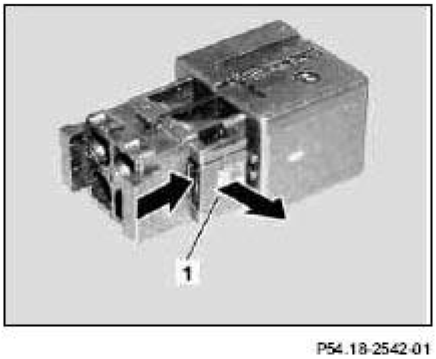


Fig. 593: Pressing Slide Valve Out Of Last Detent - Shown On A 4-Pin RK 2.5 Solder Contact Plug

Secondary release on version with retaining clamp (RK 2.5 solder contact)

1. Using a suitable tool, pry up the side clips of the retaining clamp (1).
2. Open the retaining clamp (1).

Shown on a 2-pin RK 2.5 solder contact plug

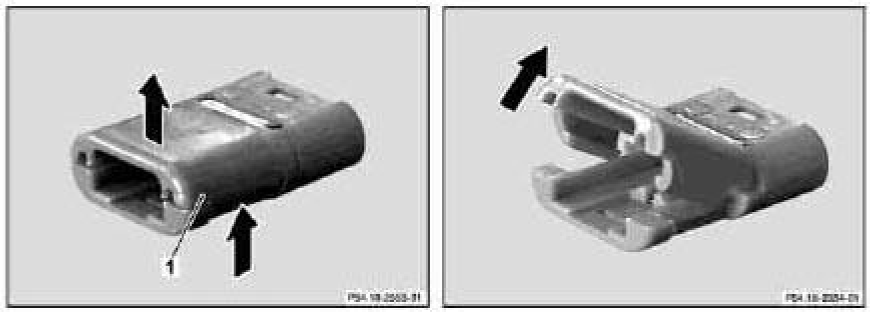


Fig. 594: Opening Retaining Clamp - Shown On A 2-Pin RK 2.5 Solder Contact Plug

Unpin contact from the plug (RK 2, 5 solder contact)

1. Insert blade holder with clamping pliers and blade for RK 2.5 solder contact from the back side into the cable duct of the plug.

   Align the sleeve of the blade for RK 2.5 solder contact with the spring shackle (1) in the plug housing.

   This step presses on the spring shackle (1) of the plug.

2. Now gently pull the contact pin, together with the blade holder, with clamping pliers and blade for RK 2.5 solder contact to remove it from the back of the plug.

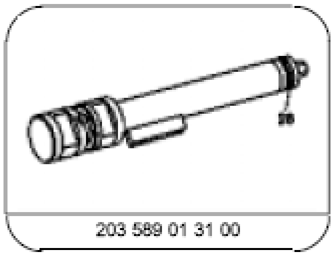


Fig. 595: Contact From Plug (RK 2, 5 Solder Contact)

REMOVE CONTACTS FROM SPADE-TYPE CONTACT SYSTEM COUPLING - AR00.19-P-0120-19A

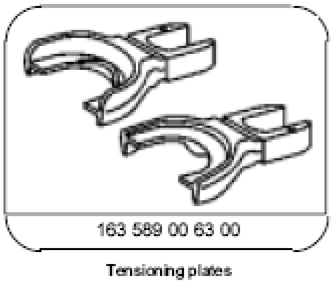


Fig. 596: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

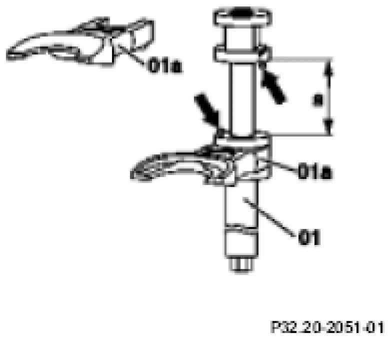


Fig. 597: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

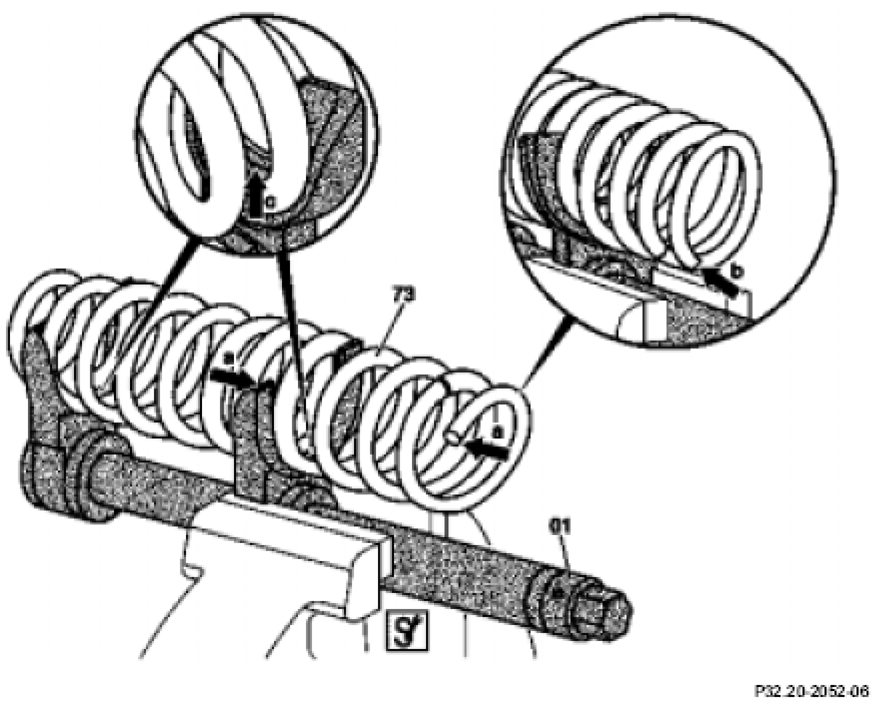
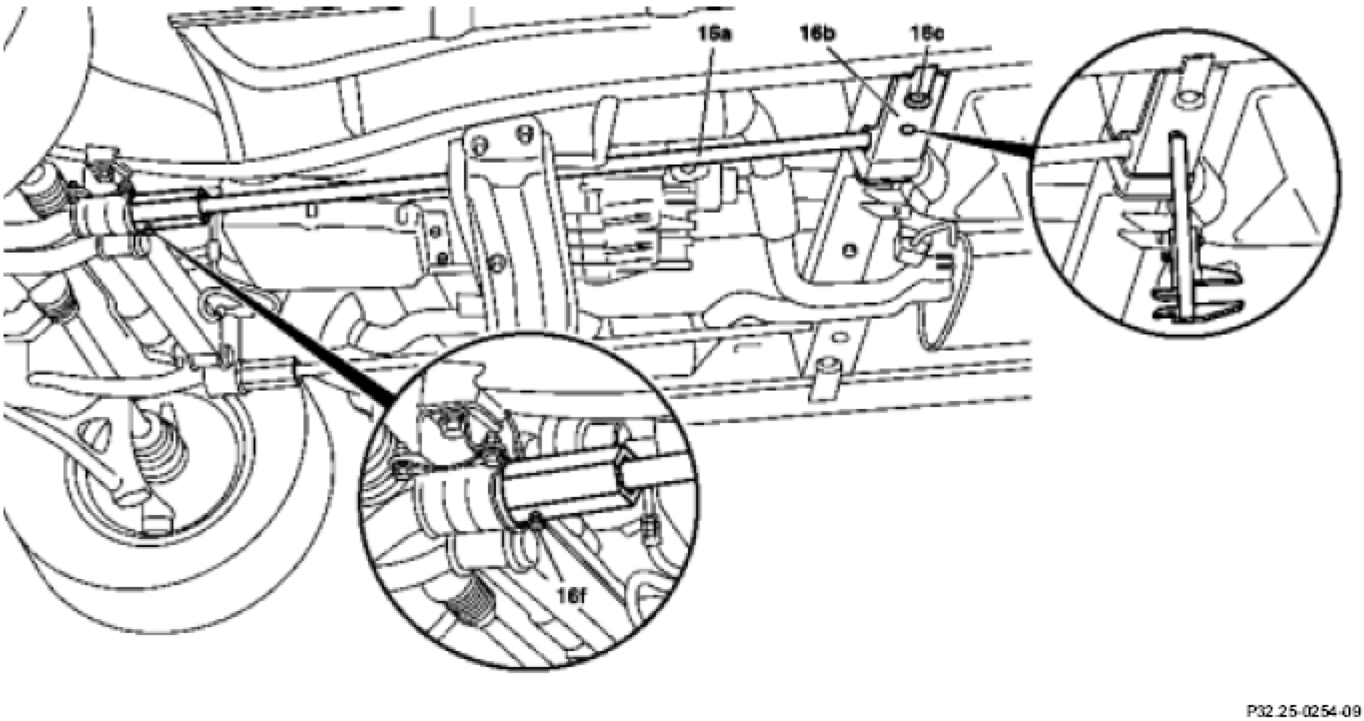


Fig. 598: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



16a	*Torsion bar spring*	*16c*	*Bolt*
16b	*Counterplate*	*16f*	*Bolt*

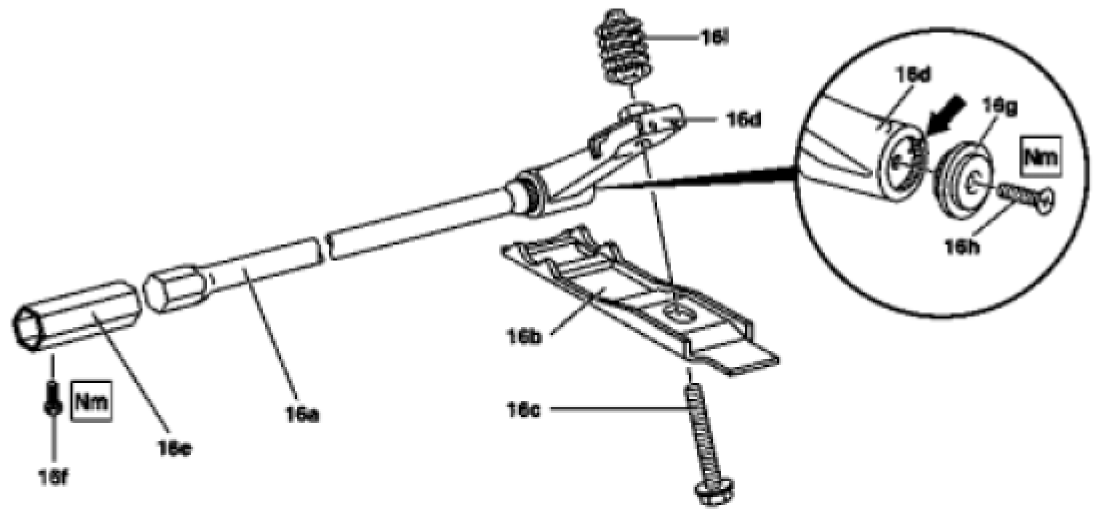
Fig. 599: Identifying Unlocking Device With RK 1.5 Ejector (220 589 01 99 20)

Unpin female contacts from coupling (LKS 1.5)

1. Insert release tool with RK 1.5 ejector i033 into the contact cavity of the connector (1) from the front end.

   In this step, the sleeve (3) of the release tool with RK 1.5 ejector compresses the spring shackles on the female contact (2).

2. Press the female contact (2) from its seat in the housing using the plunger on the release tool with RK 1.5 ejector against the spring force of the tool.



P32.20-0273-

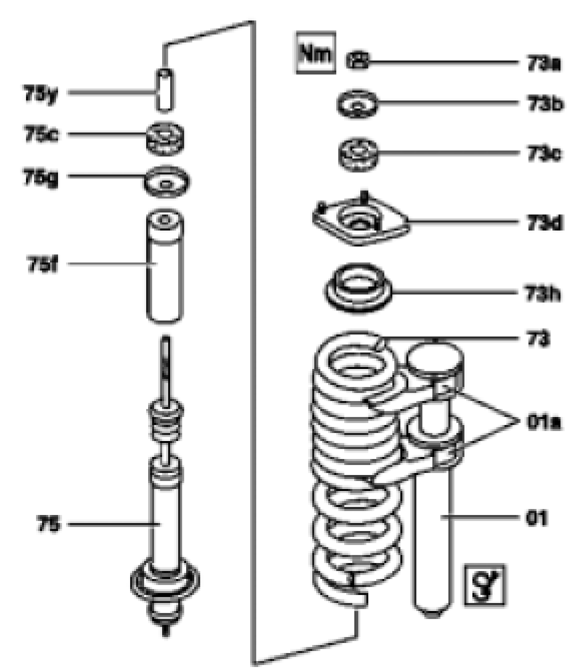
16a	Torsion bar spring	16d	Clamping lever	16g	End cover
16b	Counterplate	16e	Profile sleeve	16h	Bolt
16c	Bolt	16f	Bolt	16i	Rubber bellows

Fig. 600: Unpinning Female Contacts From Coupling (LKS 1.5)

When pressing out the female contact (2), make sure that the tab (4) does not break off.

REMOVE CONTACTS FROM SPADE-TYPE CONTACT SYSTEM PLUG - AR00.19-P-0120-20A

73	Rear spring
73a	Nut
73b	Plate
73c	Upper rubber mount
73d	Support bearing
73h	Rear spring guide
75	Vibration damper
75c	Lower rubber mount
75f	Protective sleeve
75g	Plate
75y	Sleeve
01	Tensioning device
01a	Clamping plates



P32.20-2050-12

Fig. 601: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

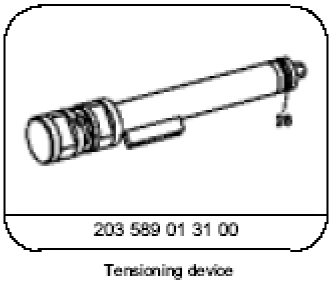


Fig. 602: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

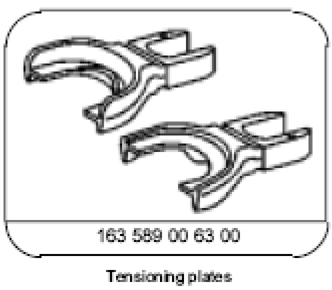
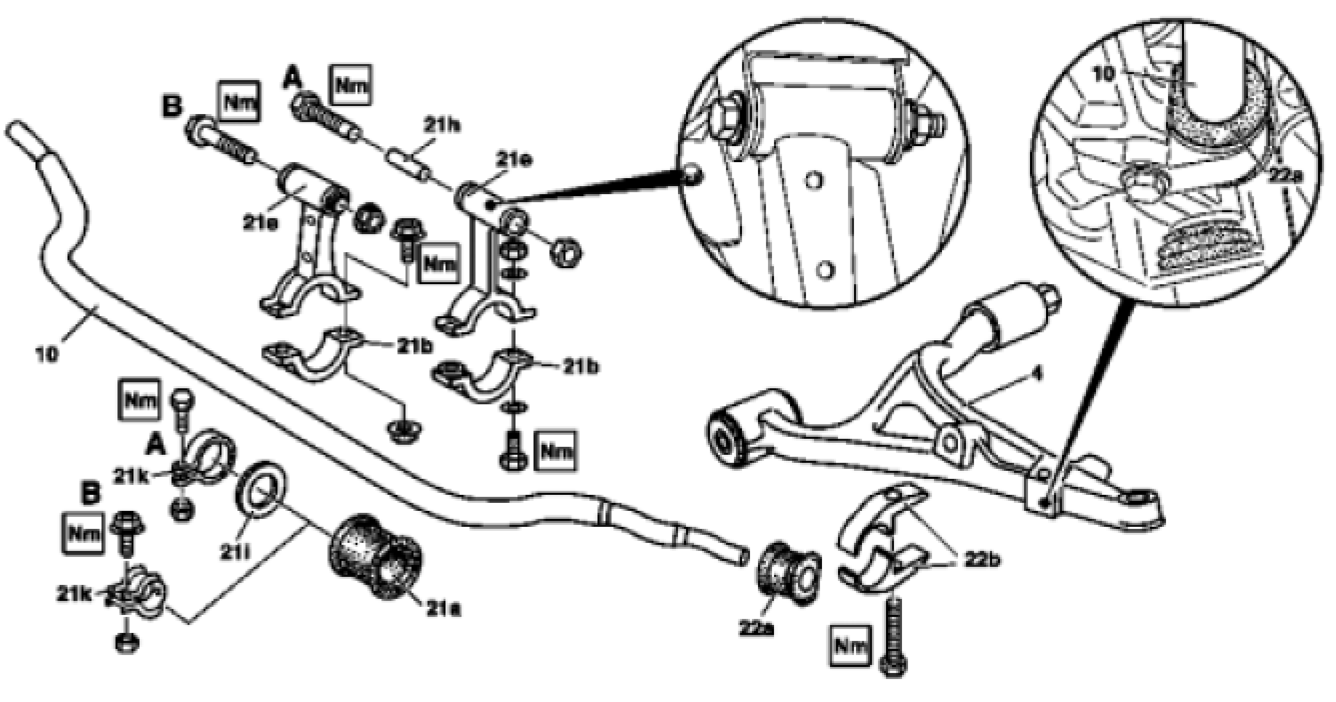


Fig. 603: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



4	*Lower transverse control arm*	*21e*	*Retaining bracket*	*22a*	*Rubber mount*
10	*Torsion bar*	*21h*	*Sleeve*	*22b*	*Bracket*
21a	*Rubber mount*	*21i*	*Washers*	*A*	*Version up to 31.07.98*
21b	*Retaining bracket*	*21k*	*Anti-shift device*	*B*	*Version as of 01.08.98*

Fig. 604: Identifying Unlocking Device With RK 1.5 Ejector (220 589 01 99 20)

Unpin contact pins from the plug (LKS 1.5)

1. Insert release tool, with RK 1.5 ejector, into the contact cavity of the plug (1) from the front end.

   Applying high pressure could break the webs of the contact cavities.

   In this step, the sleeve (3) of the release tool with RK 1.5 ejector compresses the spring tabs on the contact pin (2).

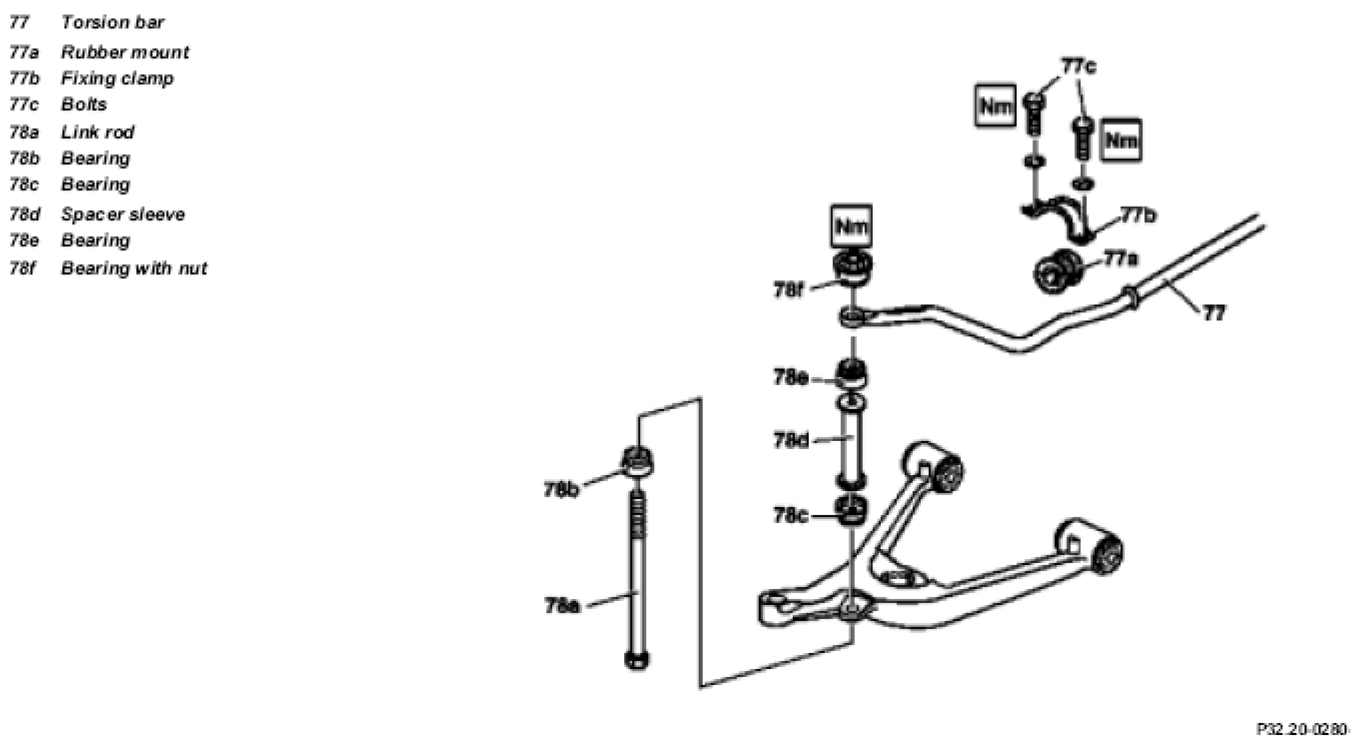
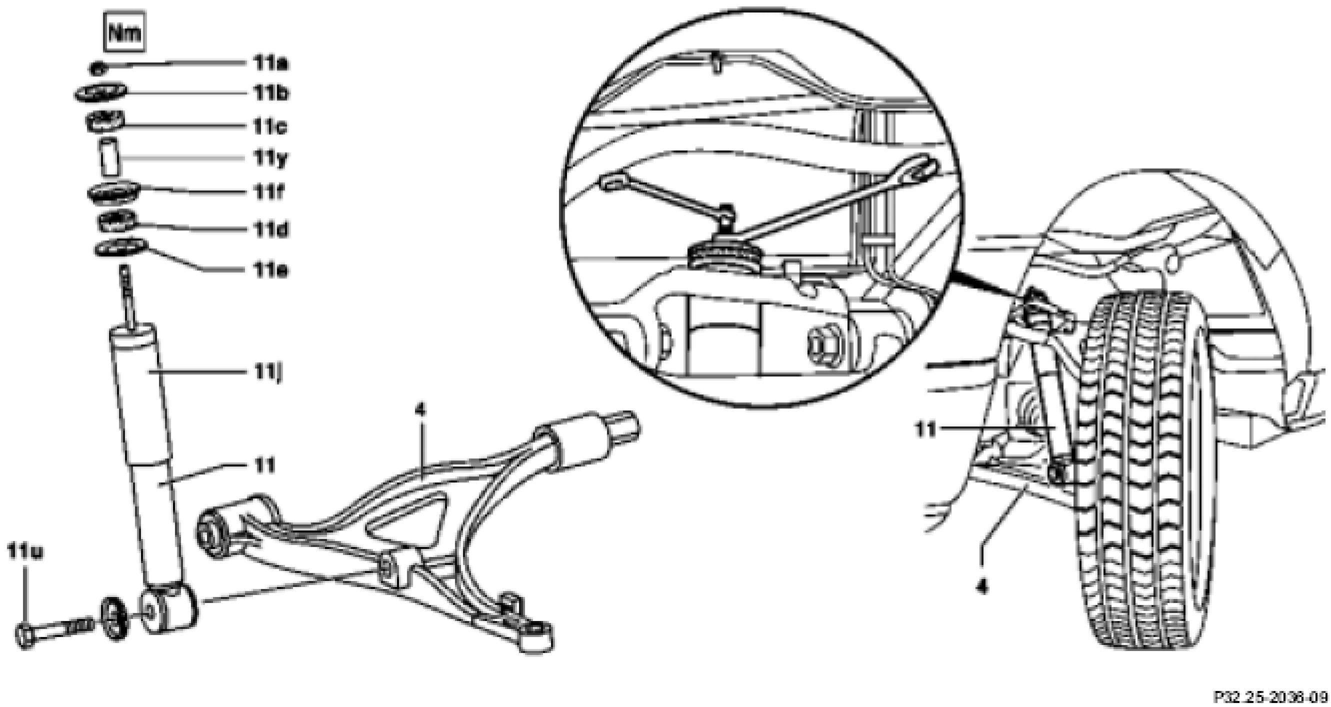


Fig. 605: Contact Pins From Plug (LKS 1.5)

2. Press the contact-pin (2) from its seat in the housing using the plunger (4) on the release tool with RK 1.5 ejector against the spring force of the tool.
3. Gently pull the respective line to remove the contact pin (2) from the plug (1).

REMOVE CONTACTS FROM SIEMENS ELO COUPLING - AR00.19-P-0120-23A



4	Lower transverse control arm
11	Vibration damper
11a	Nut
11b	Plate
11c	Upper rubber mount
11d	Lower rubber mount
11e	Plate
11f	Plate
11j	Cover
11u	Bolt
11y	Sleeve

11a	Nut
11b	Plate
11c	Upper rubber mount
11d	Lower rubber mount
11e	Plate
11f	Plate
11j	Cover
11y	Sleeve

Fig. 606: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

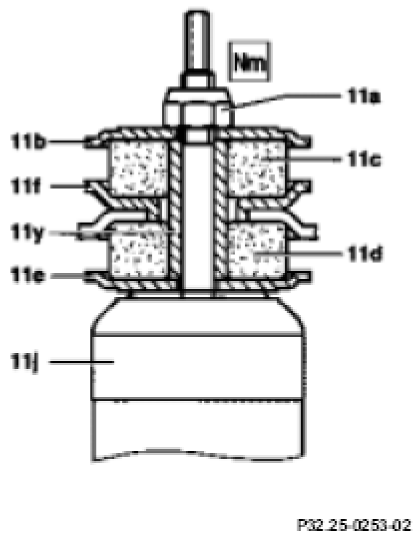


Fig. 607: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

73	Rear spring
73a	Nut
73b	Plate
73	Rubber mount
73d	Support bearing
73	Spring guide
75	Vibration damper
75c	Upper rubber mount
75f	Protective sleeve
75g	Plate
75y	Sleeve
01	Tensioning device
01a	Clamping plates

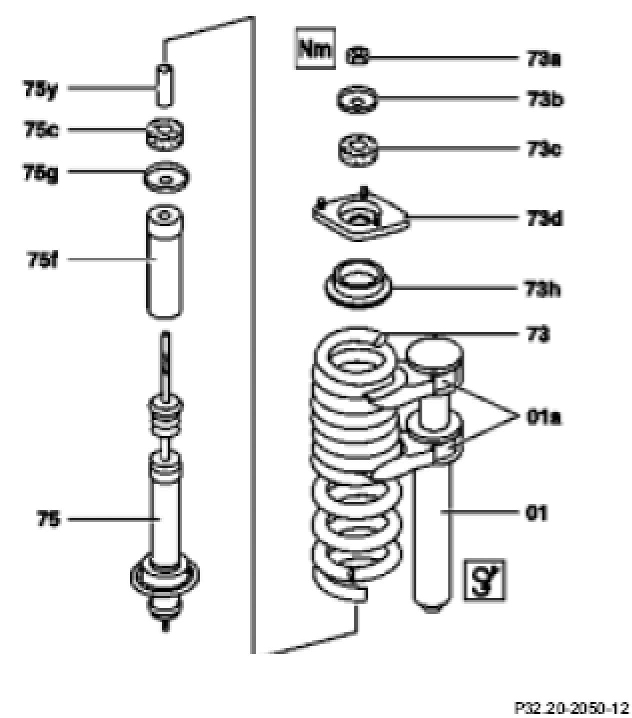


Fig. 608: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

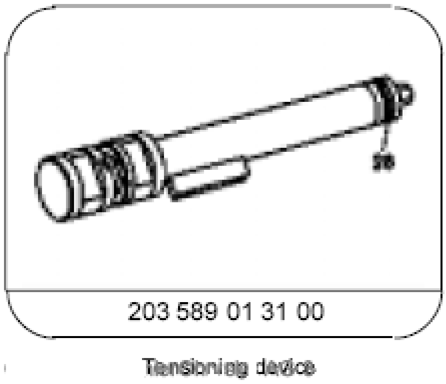


Fig. 609: Identifying Blade Holder with Clamping Pliers (220 589 01 99 50)

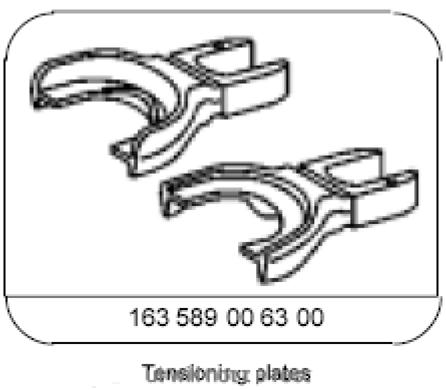


Fig. 610: Identifying MQS Blade (220 589 01 99 60)

Secondary release on version with secondary retainer (Siemens ELO)

1. Using a suitable tool, grasp the secondary retainer (1) and push it in the direction shown by the arrow into the pre-locking position (first detent) (1a).

Shown on 2-pin Siemens ELO coupling



Fig. 611: Locating Secondary Retainer (Shown On 2-Pin Siemens ELO Coupling)

Secondary release on version with retaining clamp (Siemens ELO)

1. Using a suitable tool, pry up the side clips of the retaining clamp (1).
2. Move retaining bracket (1) upward.
3. Detach the retaining bracket (1).

Shown on a 10-pin Siemens ELO coupling

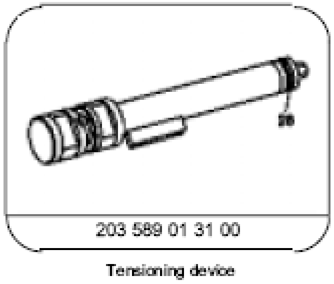


Fig. 612: Locating Retaining Clamp & Bracket (Shown On A 10-Pin Siemens ELO Coupling)

Unpin female contacts from the coupling (Siemens ELO)

1. Position the blade holder with clamping pliers and MQS blade at the side of the spring shackle for the female connector (2).
2. Press the spring tab of the female contact downward and push the female contact (2) out of the chamber of the female contact housing (1). Tug the corresponding cable at the same time to assist the unpinning procedure.

Shown on a 10-pin Siemens ELO coupling

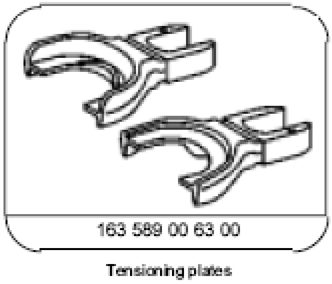


Fig. 613: Unpin Female Contacts From Coupling (Siemens ELO)

REMOVE CONTACTS FROM SIEMENS ELO PLUG - AR00.19-P-0120-24A

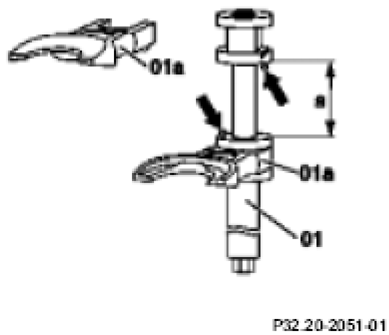


Fig. 614: Identifying Wiring Harness Repair Kit, Supplement For Passenger Cars (220 589 04 99 00)

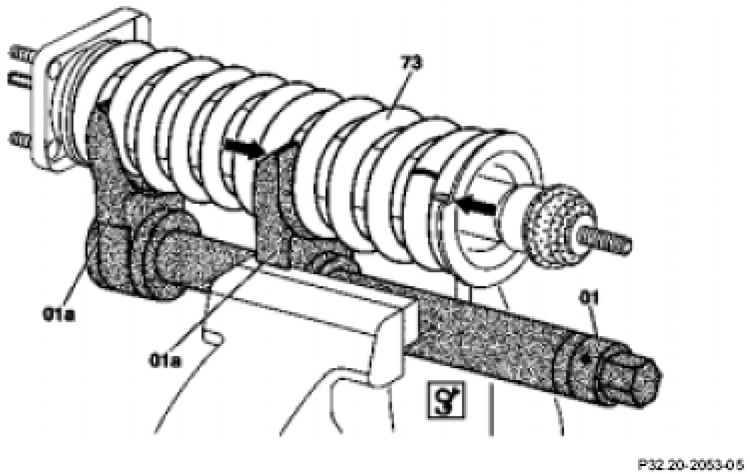


Fig. 615: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

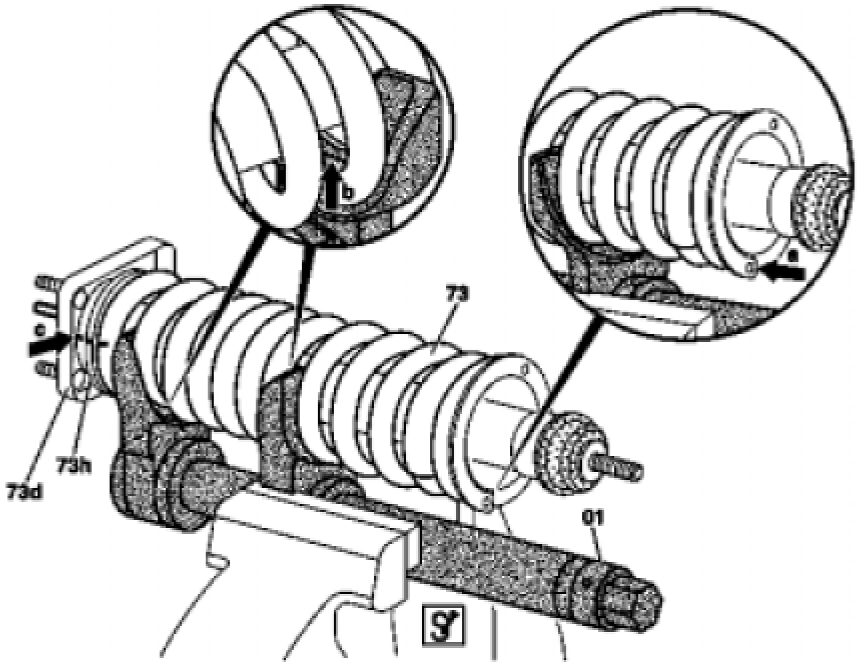


Fig. 616: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

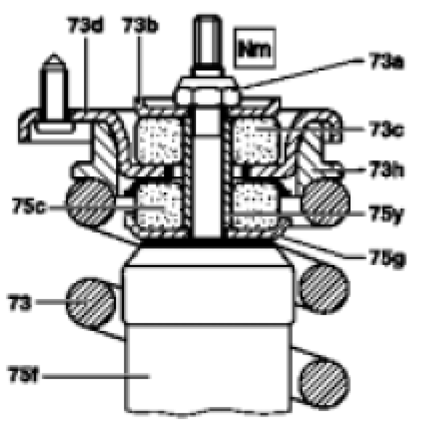


Fig. 617: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

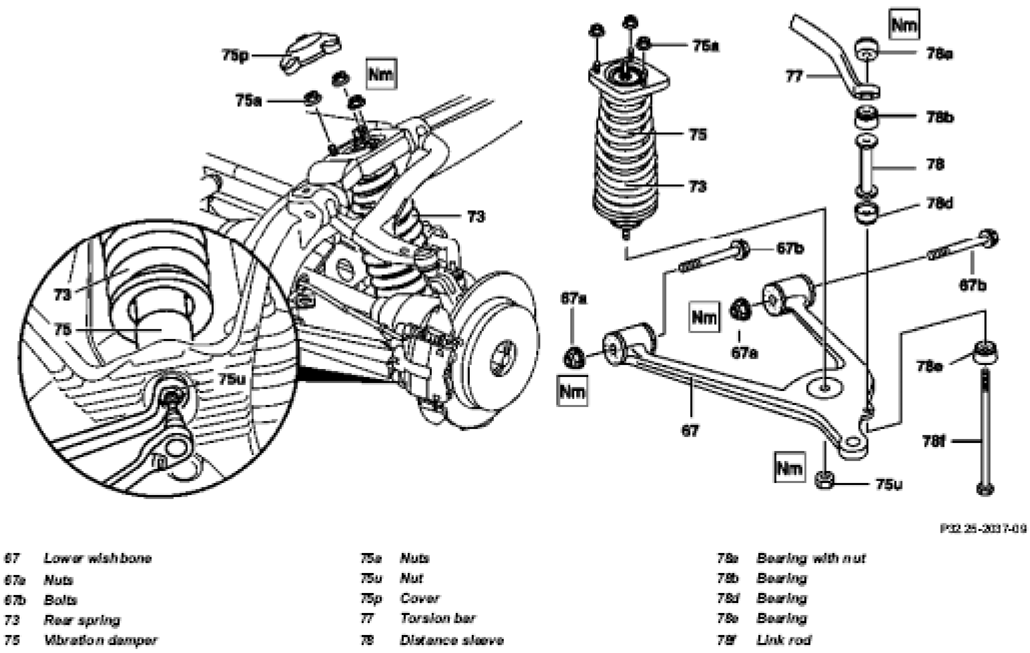


Fig. 618: Identifying MQS Blade (220 589 01 99 60)

Secondary release on version with retaining clamp (Siemens ELO)

1. Using a suitable tool, pry up the side clips of the retaining clamp (1).
2. Move the tabs.
3. Detach the retaining bracket (1).

Shown on a 10-pin Siemens ELO plug



Fig. 619: Detaching Retaining Bracket - Shown On A 10-Pin Siemens ELO Plug

Unpin contact pins from the plug (Siemens ELO)

1. Position the blade holder with clamping pliers and MQS blade on the side of the spring tab of the contact pin (2).

2. Press down the spring tab of the contact pin (2), and push the contact pin (2) out of the contact cavity of the connector housing (1). Tug the corresponding cable at the same time to assist the unpinning procedure.

   Shown on a 10-pin Siemens ELO plug

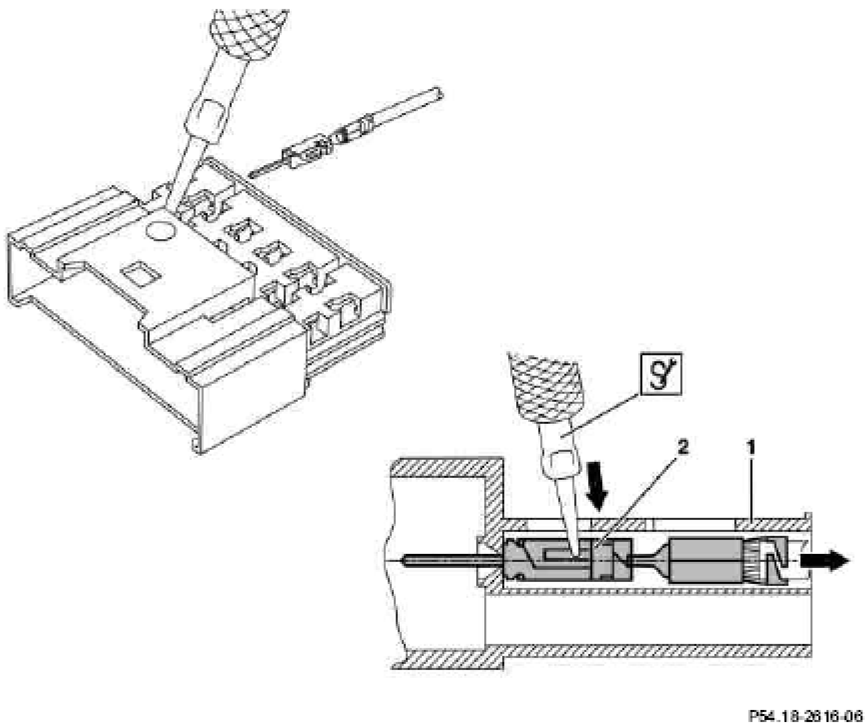


Fig. 620: Contact Pins From Plug (Siemens ELO) - Shown On A 10-Pin Siemens ELO Plug

REMOVE CONTACTS FROM MINI SPADE-TYPE CONTACT COUPLING - AR00.19-P-0120-26A

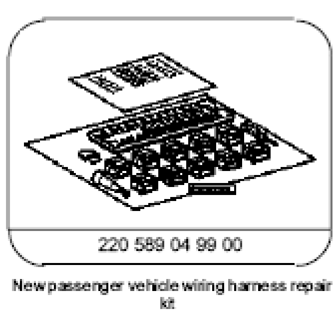


Fig. 621: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

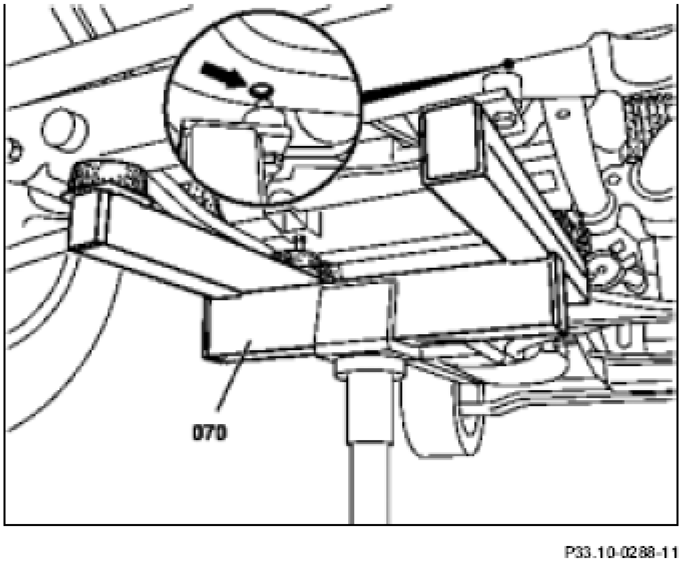
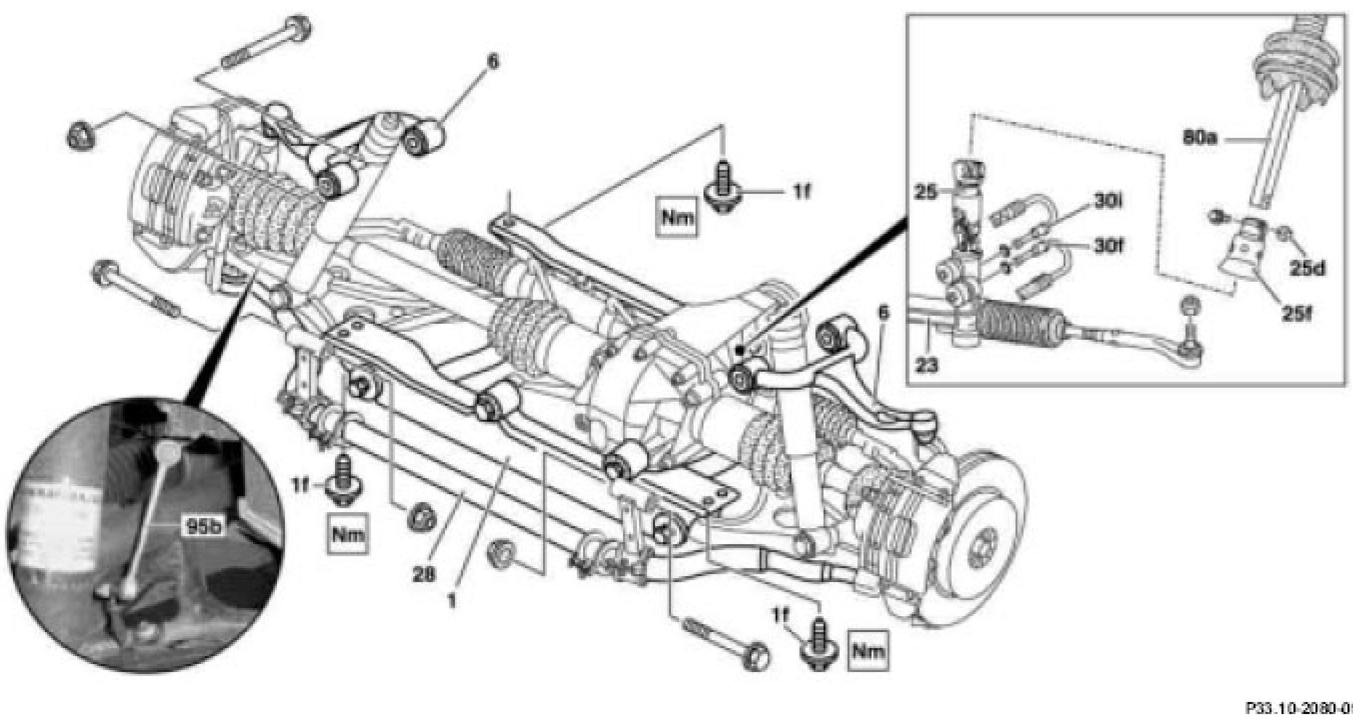


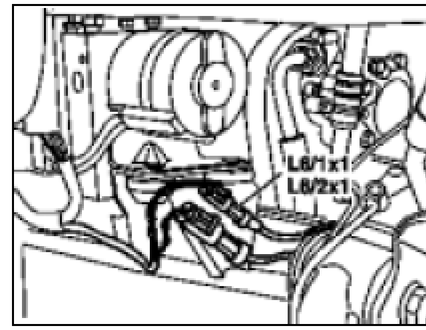
Fig. 622: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)



1	*Front axle carrier*	*25*	*Steering coupling*	*30i*	*High pressure expansion hose*
1f	*Bolts*	*25d*	*Nut*	*30f*	*Return flow pipe*
6	*Upper transverse control arm*	*25f*	*Steering coupling shield*	*80a*	*Lower steering shaft*
23	*Rack-and-pinion steering*	*28*	*Torsion bar*	*95b*	*Level controller link rod*

Fig. 623: Identifying Wiring Harness Repair Kit (220 589 02 99 00)

L6/1x1 Rpm sensor connector
L6/2x1 Rpm sensor connector



P33.10-0287-01

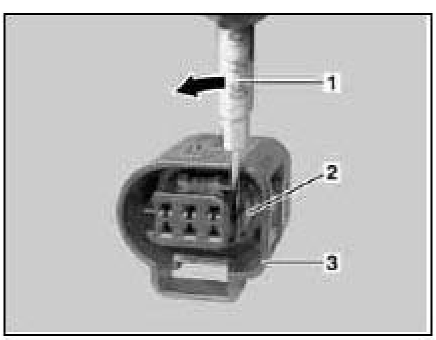
Fig. 624: Identifying Release Tool With MLK 1.2 Sleeve Ejector (220 589 01 99 25)

Secondary release on version with slider (MLK)

1. Using a suitable tool (1), move slider (2) in direction of arrow out of locked position of coupling (3).

   Do not push the tool in too far or the gasket behind the slider (2) may be damaged.

   Shown on a 6-pin MLK coupling



P00.19-3010-01

Fig. 625: Moving Slider - Shown On A 6-Pin MLK Coupling

Secondary release on version with lock tab (MLK)

1. Insert suitable tool underneath locking tabs (1).
2. Pry up the lock tabs (1) in direction shown by arrow.

Shown on a 7-pin MLK coupling

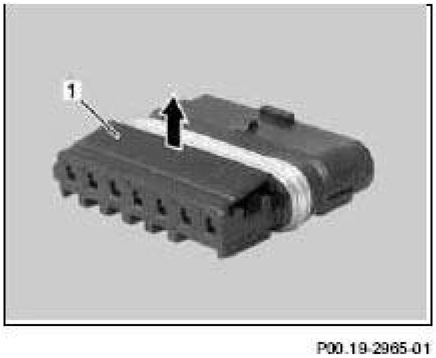


Fig. 626: Prying Up Lock Tabs - Shown On A 7-Pin MLK Coupling

Secondary release on version with retaining cap (MLK)

1. Insert a suitable tool (1) between the retaining cap (3) and the clutch housing (2).
2. Slide the retaining cap (3) against the detent resistance from the clutch housing (2) in direction shown by arrow.

Shown on a 2-pin MLK coupling

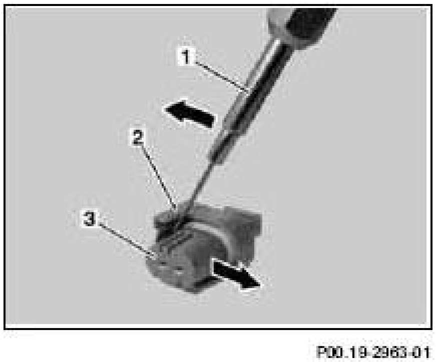


Fig. 627: Identifying Retaining Cap And Clutch Housing - Shown On A 2-Pin MLK Coupling

Secondary release on version with locking cap (MLK)

1. Move the tabs on the locking cap (4) in direction of arrow.
2. Remove locking cap (4) from coupling (5).

Shown on a 6-pin MLK coupling

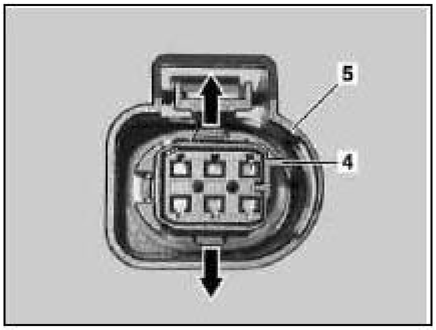


Fig. 628: Locking Cap From Coupling - Shown On A 6-Pin MLK Coupling

Unpin female contacts from coupling (MLK)

1. Insert release tool with MLK 1.2 sleeve ejector from the front into the opening of the contact cavity of the connector housing (2) until it reaches the stop.

   This step presses the spring shackle on the female contact (1) down into position.

2. Press the female contact (1) with the ejector of the release tool with MLK 1.2 sleeve ejector against the spring force of the tool out of the connector housing.

Shown on a 6-pin MLK coupling

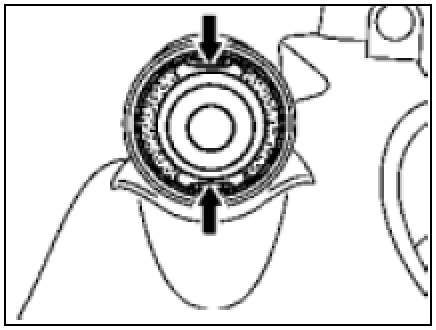


Fig. 629: Female Contacts From Coupling (MLK) - Shown On A 6-Pin MLK Coupling

REMOVE CONTACTS FROM MINI SPADE-TYPE CONTACT PLUG - AR00.19-P-0120-27A

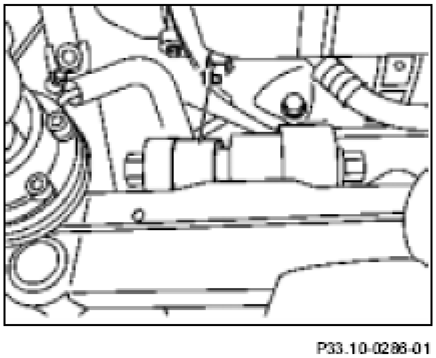


Fig. 630: Identifying New Passenger Vehicle Wiring Harness Repair Kit (220 589 04 99 00)

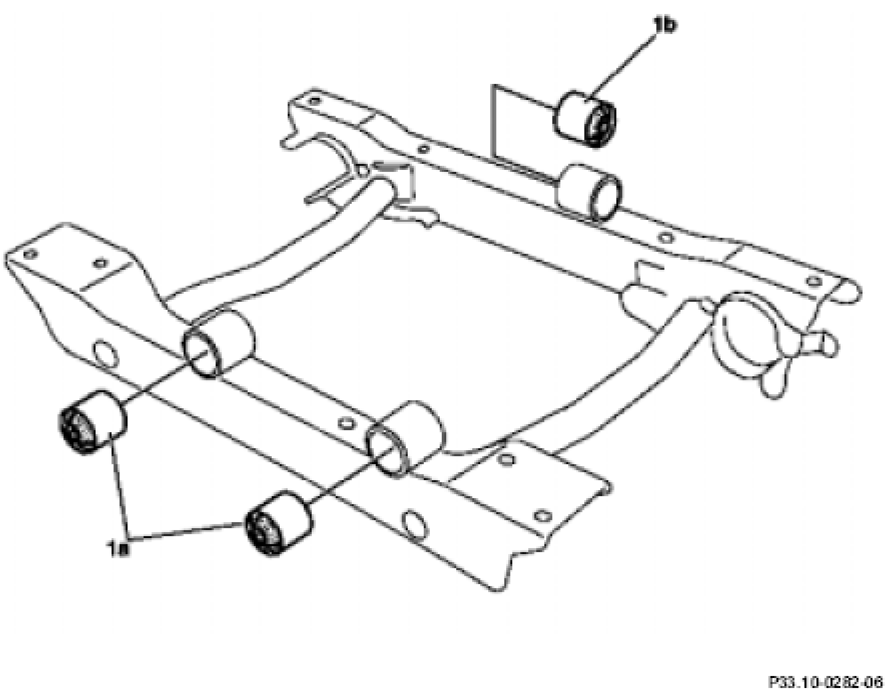


Fig. 631: Identifying Wiring Harness Repair Kit, Basic (000 589 13 99 00)

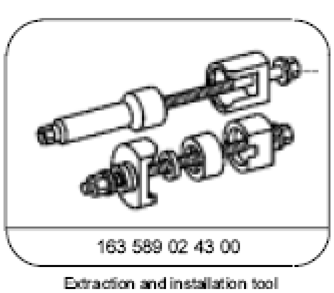
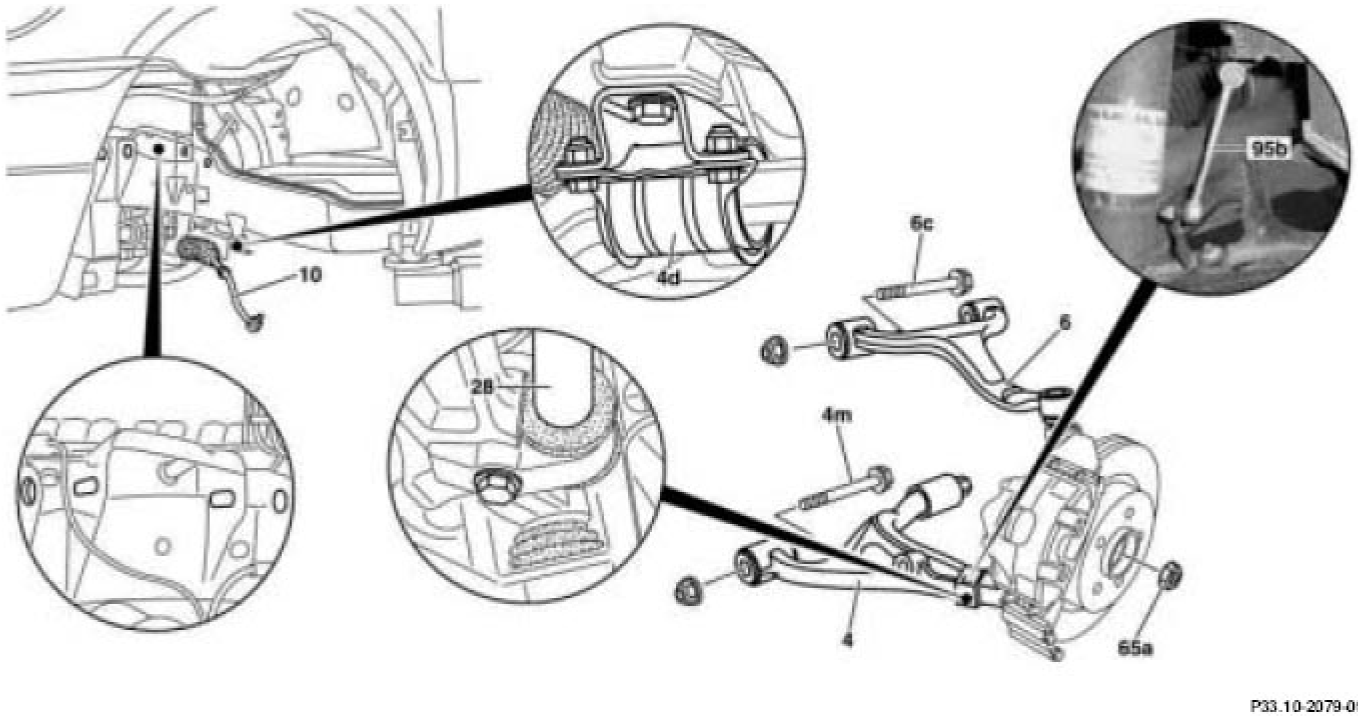


Fig. 632: Identifying Wiring Harness Repair Kit (220 589 02 99 00)



4	Lower transverse control arm	6	Upper transverse control arm	28	Torsion bar
4d	Bearing shell	6c	Bolt	65a	Hexagon nut with collar
4m	Bolt	10	Track rod	95b	Link rod of level controller

Fig. 633: Identifying Blade Holder With Clamping Pliers (220 589 01 99 50)

L6/1x1	Rpm sensor connector
L6/2x1	Rpm sensor connector

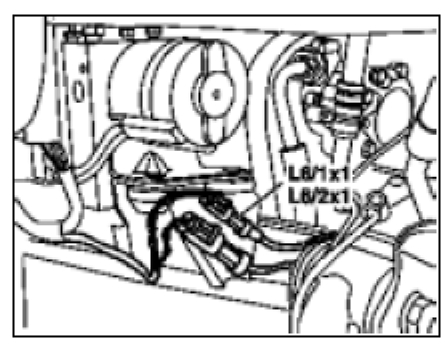


Fig. 634: Identifying MQS Blade (220 589 01 99 60)

Secondary release on version with retainer housing (MLK)

1. Using a suitable tool (1), pry the clutch housing (3) from the main housing (2) in direction shown by arrow.

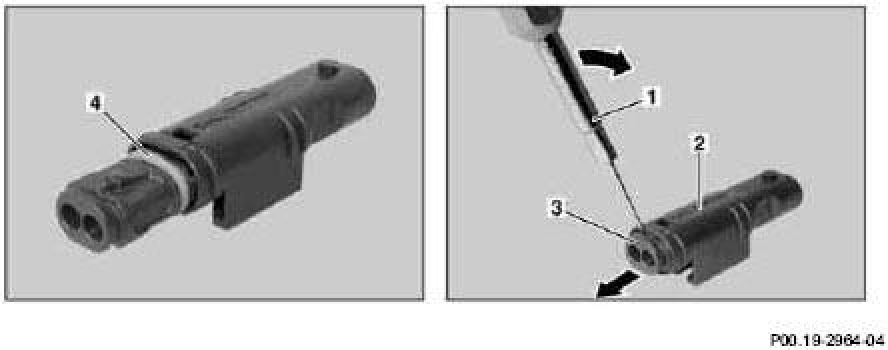


Fig. 635: Prying Clutch Housing From Main Housing - Shown On A 2-Pin MLK Plug

During assembly, make sure that the gasket (4) is not damaged. Otherwise, water entering the connector may lead to contact problems.

Shown on a 2-pin MLK plug

Secondary release on design with cap (MLK)

1. Using a suitable tool (1), pry up lock tab (2) for cap (3).
2. Slowly pull the plug housing (4) from the cap (3) in direction shown by arrow.

i The retaining clamp (5) is under tension due to the lock tab.

3. Before installing the cap (3), center the retaining clamp (5) in the groove and hold it down.

Shown on an 8-pin MLK plug

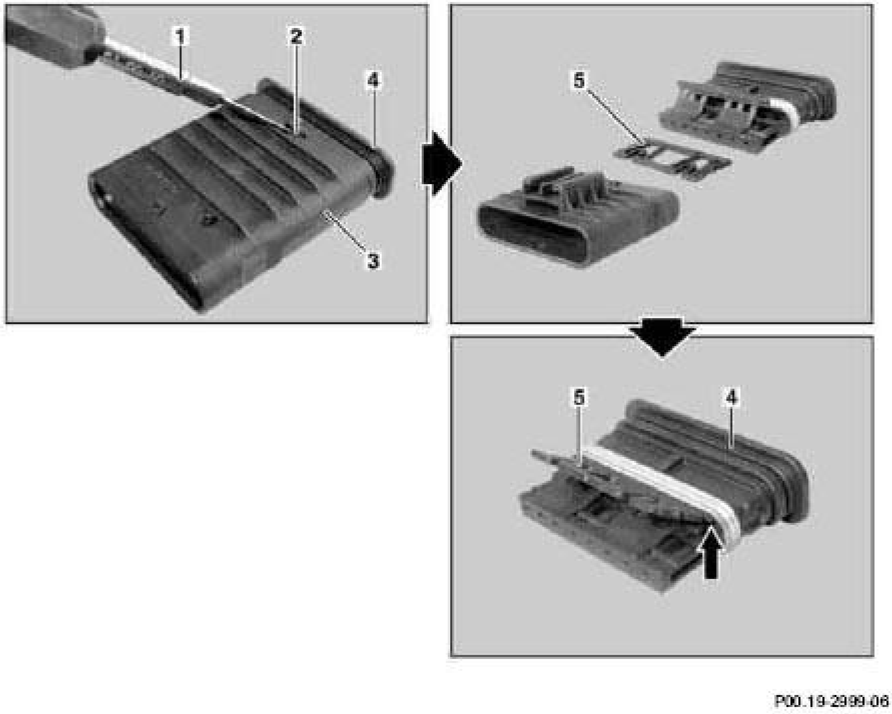
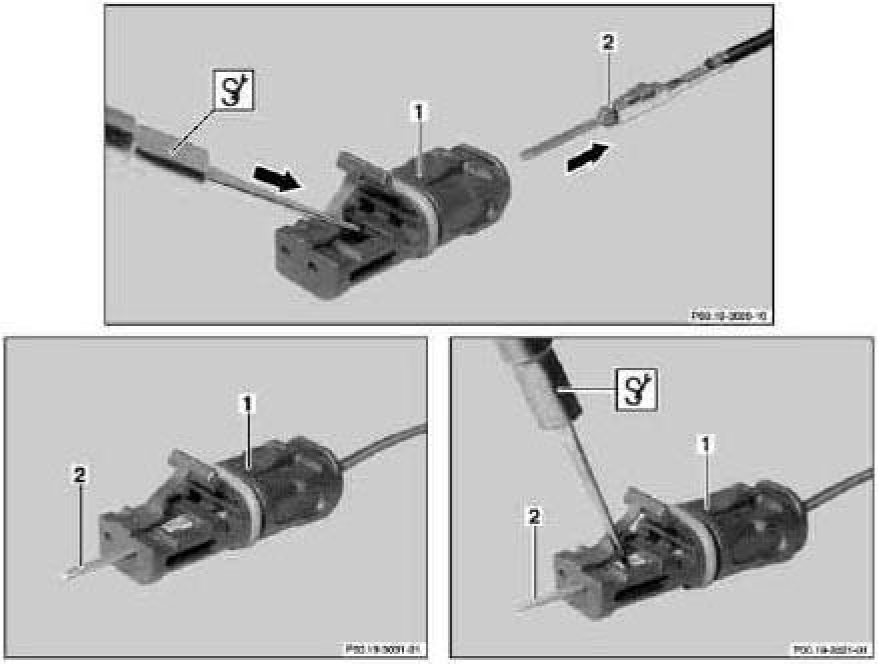


Fig. 636: Identifying Plug Housing, Cap, Retaining Clamp And Lock Tab - Shown On An 8-Pin MLK Plug

Unpin contact pins from the plug (MLK)

1. From above, insert the blade holder with the clamping pliers and the MQS blade through the opening in the exposed connector housing (1) and position it at the spring shackle on the contact pin (2).
2. Press the spring shackle on the contact pin (2) down and slide the contact pin (2) out of the contact cavity of the connector housing (1). Tug the corresponding cable at the same time to assist the removal procedure.

Shown on a 2-pin MLK plug



P00.19-3019-06

Fig. 637: Contact Pins From Plug (MLK) - Shown On A 2-Pin MLK Plug

REMOVING CONTACTS FROM PLUGS AND CONNECTORS - AR00.19-P-0120A

MODEL 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461, 463

Figure/item, etc.	Work instructions		
(!)	Notes on replacement of safety-relevant and special components	Model 124, 126, 129, 140, 163, 164, 168, 169, 170, 171, 199, 202, 203, 208, 209, 210, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251, 414, 461 as of 1.4.94, 463	**AH00.19-P-1000-08A**
i	Notes regarding plug connections		**AH00.19-P-1000-06A**
i	Remove contacts from Micro Quadlock System plug	Micro Quadlock System, plug variant 1	**AR00.19-P-0120-03A**
i	Remove contacts from Micro Quadlock System plug	Micro Quadlock System plug, variant 2	**AR00.19-P-0120-03B**
i	Remove contacts from Micro Quadlock System	Micro Quadlock System coupling, variant 1	**AR00.19-P-0120-04A**

	coupling		
i	Remove contacts from Micro Quadlock System coupling	Micro Quadlock System, coupling variant 2	**AR00.19-P-0120-04B**
i	Remove contacts from E 95 coupling		**AR00.19-P-0120-05A**
i	Remove contacts from Junior Power Timer coupling		**AR00.19-P-0120-07A**
i	Remove contacts from Junior Power Timer plug		**AR00.19-P-0120-08A**
i	Remove contacts from sensor laminated contact plug	Spade-type sensor contact plug Design 97	**AR00.19-P-0120-01A**
i	Remove contacts from sensor laminated contact coupling	Spade-type sensor contact coupling, Design 97	**AR00.19-P-0120-02A**
i	Remove contacts from sensor laminated contact plug	Spade-type sensor contact plug Variant 2	**AR00.19-P-0120-01B**
i	Remove contacts from sensor laminated contact coupling	Spade-type sensor contact coupling, variant 2	**AR00.19-P-0120-02B**
i	Remove contacts from standard power timer coupling		**AR00.19-P-0120-10A**
i	Remove contacts from standard power timer plug		AR00.19-P-0120-11A
i	Remove contacts from FIN sensor contact plug		**AR00.19-P-0120-13A**
i	Remove contacts from FIN sensor contact coupling		**AR00.19-P-0120-12A**
i	Remove contacts from maxi power timer coupling		**AR00.19-P-0120-14A**
i	Remove contacts from round plug contact 2.5-plug	Round plug contact 2.5 variant 1	**AR00.19-P-0120-16A**
i	Remove contacts from round plug contact 2.5-coupling	Round plug contact 2.5, variant 1	**AR00.19-P-0120-15A**
i	Remove contacts from 2.5 solder contact plug round plug contact		**AR00.19-P-0120-18A**

i	Remove contacts from 2.5 solder contact coupling round plug contact		**AR00.19-P-0120-17A**
i	Remove contacts from laminated contact system plug		**AR00.19-P-0120-20A**
i	Remove contacts from laminated contact system coupling		**AR00.19-P-0120-19A**
i	Remove contacts from Micro Timer 3 coupling		**AR00.19-P-0120-06A**
i	Remove contacts from Siemens ELO plug		**AR00.19-P-0120-24A**
i	Remove contacts from Siemens ELO coupling		**AR00.19-P-0120-23A**
i	Remove contacts from Multi-Contact-Point-coupling		**AR00.19-P-0120-09A**
i	Remove contacts from mini laminated contact coupling		**AR00.19-P-0120-26A**
i	Remove contacts from mini laminated contact plug		**AR00.19-P-0120-27A**
i	Remove contacts from YAZAKI 1.5 system coupling	461 as of 1.4.94	AR00.19-P-0120-28A

PERFORMING BASIC PROGRAMMING - AR00.19-P-0200GH

MODEL 163

	Adjusting		
1	Set time on instrument cluster	i See Operating Instructions	
2	Set clock of stationary heater	i See Operating Instructions	
3	Normalize side power windows	i See Operating Instructions	
4	Activate steering angle sensor	i Electronic stability program (ESP) Code (472a) as of 1.9.98. i Refer also to operating instructions.	**AR46.10-P-0300-01A**

5	Synchronize sliding/pop-up roof ☞GF	i Refer also to operating instructions. i Glass electric sliding/tilting roof, code (414a).	**GF77.20-P-3002GH**
6	Standardize lamella sliding roof ☞GF	i Refer also to operating instructions. i Lamella sliding roof, code (417a).	**GF77.20-P-3006GH**
7	Code radio	MB i Refer also to operating instructions. Hi-Line, Premium with Bose. i Refer also to operating instructions.	**AR82.60-P-7502-01B** **AR82.60-P-7502-01GH**
8	Calibrate compass	i See Operating Instructions	

LIFTING VEHICLE WITH PIT LIFT OR WORKSHOP JACK - AR00.60-P-1000-01GH

Lifting at front

i

Place inspection pit lift or garage jack at the front cross bridge for the front-axle carrier The garage jack can use the side jacking points.



Fig. 638: Identifying Lifting At Front

Lifting at rear

i

Place inspection pit lift or garage jack at the rear cross bridge for the rear-axle carrier The garage jack can use

the side jacking points.

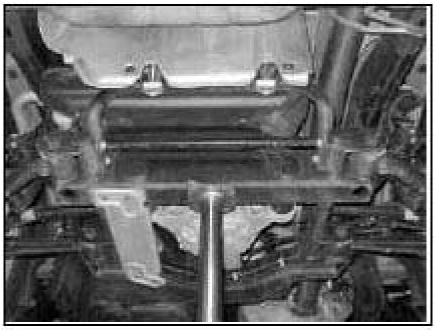


Fig. 639: Identifying Lifting At Rear

RAISING, JACKING UP VEHICLE - AR00.60-P-1000GH

MODEL 163

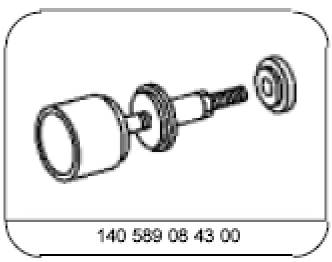


Fig. 640: Raising, Jacking Up Vehicle

Fig. item, etc.	Work instructions		
⚠ Danger!	Lethal injuries are possible if vehicle slips off of lifting platform	Align vehicle between the four lifting platform pillars and position the four support plates at the hoist mounting points specified by the vehicle manufacturer.	AS00.00-Z-0010-01A
⚠ Danger!	Danger of accident through self-acting movement of the vehicle when jacked up Risk of injury through intrusion into engine compartment or driveline where rotating parts pose a serious hazard.	Make sure that the jack stands are securely positioned. Authorized person should occupy driver's seat. Wear closed and close-fitting work clothes. Do not grasp hot or rotating parts.	AS00.00-Z-0008-01A

(!)	If the support plates are not properly mounted (012) at the vehicle's designated jacking points (1, 2) damage may occur to the side sill covers (3).		
(!)	The vehicle should be secured against tipping or falling off the platform when removing any units.		
i	Lifting vehicle with inspection pit lift or garage jack	Inspection pit lift.	**AR00.60-P-1000-01GH** ***WE58.40-Z-1002-05A**
1	Forward jacking points		
2	Rear jacking points		
3	Side sill covers		
011	Lifting platform		***WE58.40-Z-1001-05A**
012	Support plates	All four support plates must be extended to an equal distance (Dimension X).	

Workshop equipment

WE58.40-Z-1001-05A	Two-post lifting platform
WE58.40-Z-1002-05A	Pit lift

MAINTENANCE

PREFACE - AP00.20-P-0000-01C

These "Service Documents" contain all the maintenance operations for the basic and national versions of the following models:

- Model 170, 129, 140, 202 as of 1.6.97
- Model 210 as of 1.3.97
- Models 163, 168, 203, 208, 209, 215, 220, 230
- Type 414

This maintenance manual became necessary with the introduction of the Active Service System (ASSYST). It contains all maintenance operations for vehicles with the Active Service System (ASSYST) and is divided into the two volumes 4 and 4.1.

The system for demand-related complete vehicle maintenance is described in the Introduction into Service manual "Active Service System (ASSYST)".

These maintenance documents contain instructions relating to carrying out maintenance and repair operations on Mercedes-Benz passenger cars. They are intended for the exclusive use of workshops affiliated to the Mercedes-Benz Organization.

The instructions form the basis for proper and competent service and maintenance.

The nature in which the operations are described is based on the training standard of a fitter who has completed vocational training and has good knowledge of our products. This level of knowledge is essential for carrying out the described work.

The continuous further development and improvement of our vehicles may lead to deviations between the actual technical status of the vehicles and the operation descriptions.

DaimlerChrysler AG reserves the right to make alterations and modifications at any time and without prior notice.

If there are any open questions relating to repair procedures, please take up the matter with the competent contact person in the relevant national organization (for DCVD refer to valid Service Information Group 99). Additional information about the breakdown and structure of the work descriptions and the meaning of the symbols (Logos) can be found in the Workshop Information System WIS.

Each described maintenance operation has a number (operation item) which is stated in the head line. The operation item in the maintenance manual is identical with that on the SERVICE SHEET for the Active Service System (ASSYST), enabling the appropriate texts and data to be found straight away if required when performing maintenance jobs.

Maintenance operations which are not described have no number (operation item) on the SERVICE SHEET.

The group numbers familiar from the workshop literature are used for the first two digits of the 4-digit operation item numbers. This ensures the assignment of each maintenance operation to the group.

DaimlerChrysler AG

Global Service & Parts

July 2004

SAFETY NOTES/WARNING NOTES - AP00.20-P-0000-02A

Safety information (hazardous situations for persons), warnings (quality of work, property damage).

These notes are identified by the following symbols (logos):

The logo "⚠ Danger! " represents safety information (dangerous situations for persons).

The logo " "represents a warning (work quality, property damage).

These instructions are to be read carefully and complied with in full In order to rule out any risk of personal injury, to avoid impairing the reliability and safety of the vehicle, and to prevent damage to the vehicle as a result of work improperly carried out.

It is therefore not possible for DaimlerChrysler AG to evaluate in the last consequence every situation which might present a risk of injury for the operative. It is therefore an urgent necessity that everyone who carries out repair work on Mercedes-Benz passenger cars by applying his professional knowledge satisfies himself that his own safety is not at risk and that the vehicle will not suffer any negative effects, in particular of a safety engineering nature, as a result of the repair procedure adopted.

It is therefore expressly pointed out that all work for the operations described must be carried out in compliance with valid directives and instructions from the responsible local authorities and those relating to health, work safety and environmental protection.

ADDITIONAL DESIGNATION FOR MODELS AND COMPONENTS - AP00.20-P-0000-03A

Models and components, in addition to their 3 to 6-figure designation (e.g. 124 or 124.028), may have different versions, dates and work procedures. These differences are indicated by the following additional designations:

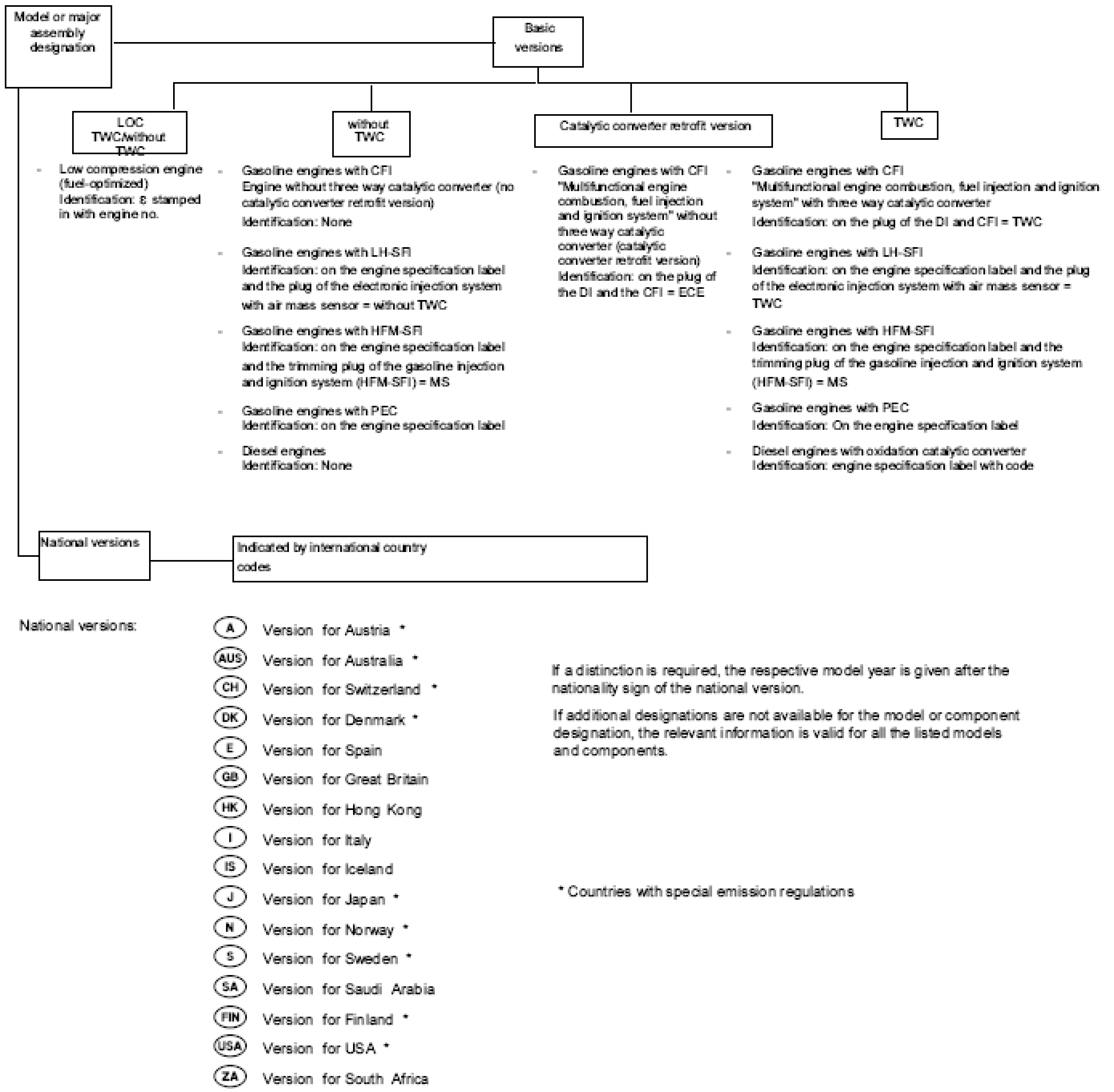


Fig. 641: Additional Designation For Models And Components

SERVICE INTERVALS/WORK SHEETS GENERAL INFORMATION - AP00.20-P-0000-04C

The Active Service System (ASSYST) was introduced as of 3/97 first of all on model 210 and as of 1.6.97 on models 170, 129, 140, 202 and from the start of production on models 163, 168, 203, 208, 209, 215, 220, 230, 414.

For these vehicles the service sheet for the Active Service System (ASSYST) and the maintenance manual volume 4 apply.

With the ASSYST service sheet the previous distinction between care service and maintenance service no longer applies. Instead, the service category A (minor service) and service category B (major service) have been introduced.

The service scopes for each model series can be seen in the respective valid service sheet.

The order no. is stated on the particular SERVICE SHEET.

On manual transmissions, automatic transmissions, transfer cases, front axles and rear axles the service item "Check fluid level" has been replaced by an inspection of all visible parts for leaks.

In view of the fact that these components are not oil consumers, as is the case for the engine, a loss of oil can occur only to the outside.

If any leaks are present, the procedure, as before, is to determine the cause and to rectify it subject to a separate repair order.

The service operations carried out should be documented in the boxes in front of the operation titles. It is essential to ensure that the specified service operations are carried out in full.

An indication is given in the boxes after the operation titles of which service operations should be carried out for service category A (minor service) or service category B (major service). Enter a cross behind these boxes to identify any items which are not in proper order when the vehicle is received.

Additional operations should be defined by the service adviser in agreement with the customer and an indication should be made on the service sheet whether these additional operations are to be carried out.

5 Steering knuckle
08a Bolt with collar nut
08b Puller sleeve
08e Thrust bearing
08i Collar nut
9p Circlip

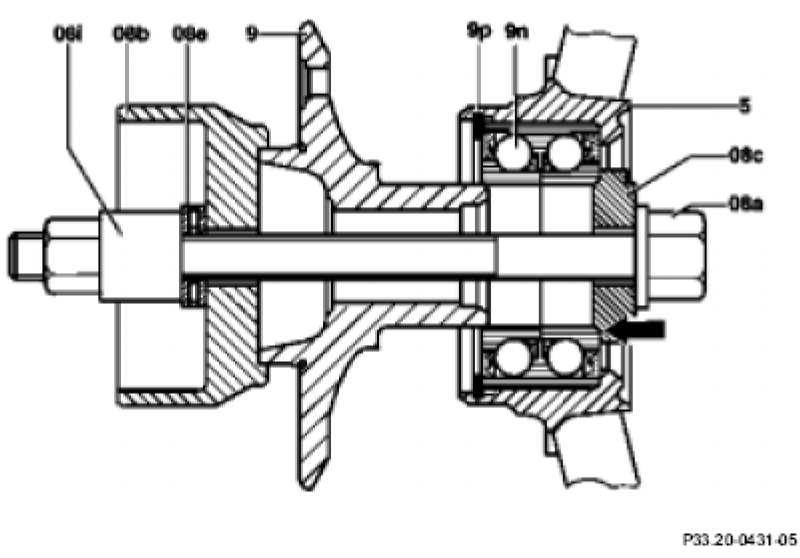


Fig. 642: Service Intervals/Work Sheets

SPECIAL SERVICE PROCEDURES - AP00.20-P-0000-06B

Have the brake fluid replaced if more than 2 years have elapsed since the last change; this is best done in the spring.

The coolant should be inspected for correct anticorrosion/ antifreeze concentration before the beginning of, and during the cold season of the year. Depending on the model series, the coolant has to be replaced every 3 years or 15 years (or after 250,000 km).

Refer to the particular valid service sheet for further additional operations based on kilometers or years.

SERVICE DATE REMINDER - AP00.20-P-0000-07B

i The confirmation in the service booklet must be filled out completely and signed for every service (A or B).

Confirmation in the service booklet

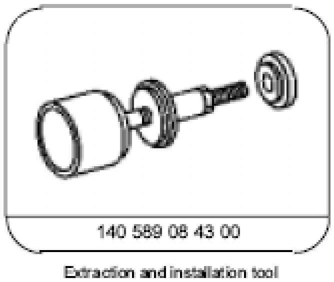


Fig. 643: Identifying Service Date Reminder

SERVICE CARD FOR UNITS - AP00.20-P-0000-08A

Mercedes-Benz

Service card - major assembly

Maintenance

During the first service after exchanging a Mercedes-Benz genuine major assembly the operations listed in the maintenance sheet or maintenance manual are to be carried out and confirmed.

WARNING: **When vehicles without service display are inspected, the assembly will be serviced within the scope of the following care and/or maintenance service.**

Running-in:

The first 1 500 km

Run in gently, but briskly.

Avoid high load, high rpm and high speed.

Automatic transmissions: do not use kick-down and do not brake the vehicle by shifting down manually.

After 1 500 km

Gradually bring the vehicle up to its full road and engine speeds.

MAINTENANCE - AP00.20-P-0000D

MODEL 210 as of 1.3.97, 129,140,170, 202 as of 1.6.97, 163, 168, 203, 208, 209, 215, 220, 230, 414 ASSYST

i	Preface		**AP00.20-P-0000-01C**
i	Safety notes/warning notes		**AP00.20-P-0000-02A**
i	Additional designation for models and components		**AP00.20-P-0000-03A**
i	Service intervals/work sheets general information		**AP00.20-P-0000-04C**
i	Special service procedures		**AP00.20-P-0000-06B**
i	Service date reminder		**AP00.20-P-0000-07B**
i	Service card for units		**AP00.20-P-0000-08A**
SI	Service Information: Engine oil change	Models 129, 163, 168, 170, 203, 208, 209, 210, 215, 220, 230	SI 18.00-P-0011A
	SERVICE SHEET for Active Service System (ASSYST)	Model 129 as of 1.6.97 Model 140 as of 1.6.97 Model 163 Model 168 Model 170 as of 1.6.97 Model 202 as of 1.6.97 Model 203 Model 208 Model 209 Model 210 as of 1.3.97 Model 215 Model 220 except code Z04/Z07 Model 220.175/176/178	AP00.20-P-0001D AP00.20-P-0001E AP00.20-P-0001A AP00.20-P-0001B AP00.20-P-0001C AP00.20-P-0001F AP00.20-P-0001K AP00.20-P-0001G AP00.20-P-0001M AP00.20-P-0001H AP00.20-P-0001J AP00.20-P-0001I AP00.20-P-0001IG

		with Code Z04/Z07 Model 230 Model 414	 AP00.20-P-0001L AP00.20-L-0001A
	Taxi service	Models 202, 210 Model 203	AP00.20-P-0007A AP00.20-P-0007C

CHECK ALL VISIBLE PARTS FOR SIGNS OF LEAKS AND DAMAGE - AP00.20-P-0053GH

MODEL 163.113 /128 /136 /154 /157 /172 /174 /175

	Remove		
AR	Detach lower engine compartment paneling	Models 163.172/174/175	**AR61.20-P-1105GH**
AR	Remove noise encapsulation	Model 163.113/128	AR94.30-P-5400GH
	Check		
i 2	If traces of fluid are noted (e.g. oil), then determine and correct the cause (on a separate work order). Check for leaks	Engine: Transmission Transfer case Front axle Rear axle Pressure oil pump	
3	Check for leaks and fixing	Shock absorbers, suspension struts	
4	Inspect for leaks and condition	Rubber boots of front axle shafts	
5	Inspect lines and hoses for leaks and condition, pay attention to chafing points and routing	Radiator Fuel system Exhaust system Clutch actuation Automatic transmission Power steering Brake system	
	Install		
AR	Install lower engine compartment paneling.	Models 163.172/174/175	**AR61.20-P-1105GH**
AR	Install noise encapsulation	Model 163.113/128	AR94.30-P-5400GH

INSPECTING CHASSIS AND LOAD-BEARING BODY PARTS FOR DAMAGE AND CORROSION - AP00.20-P-0090GH

MODEL 163

1	Visual inspection	Control arm mountings and control arms of front axle	

		and rear axle Frame	

SAFETY PRECAUTIONS FOR NEW VEHICLES THAT ARE BEING PUT IN STORAGE - AP00.70-P-1000ZZ

MODELS all

i	New vehicles in the context of this description are vehicles for which no inspection has been carried out to date. For other vehicles, the instructions in the Specifications for Service Products apply		
BB	In areas in which extremely high corrosive attacks can be expected from experience, the measures given here are not always sufficient even for new vehicles	Export countries In these cases, proceed in accordance with Specifications for Service products.	
AR	Treatment of battery if vehicle taken out of service		**AR54.10-P-0006EA**
i	Treatment of tire inflation pressure if vehicle taken out of service	For vehicles which will be stored for longer than 2 months, the tire inflation pressure should be increased to approx. 4 bar to prevent flattening of the contact surface.	
i	Treatment of break system if vehicle taken out of service	Warm up service brake so that adhering moisture at the brake disks and the brake pads evaporates. This prevents the brake pad from becoming stuck to the brake disks. Release parking brake. The vehicle must be secured by engaging a gear/park pawl or by using wedges.	
i	Treatment of fuel system if vehicle taken out of	To protect the fuel tank from corrosion, we	

	service	recommend that the vehicle fuel tank is completely filled. Then allow gasoline engines to run warm for 2-3 minutes.	
i	Notes on paintwork, decorative and detachable components		**AH98.00-P-9019-01Z**
AP	if necessary, corrosion protection after painting (Section D)		**AP98.00-P-0641A**

RENDER NEW VEHICLES, WHICH WERE IMMOBILIZED OPERATIONAL - AP00.70-P-1001ZZ

MODEL 129, 140, 163, 168, 170, 202, 203, 208, 209, 210, 211, 215, 220, 230, 240

MODEL 461.302 /332 /342 /345

MODEL 463.200 /204 /206 /207 /208 /209 /220 /221 /224/225 /227 /228 /230 /231 /232 /233 /240 /241 /243 /244 /245 /24

1	Perform delivery inspection		
2	Check battery		**AR54.10-P-1129-01A**
3 +	Vent stationary heater and top up coolant	Model 163, 168, 170, 202, 203, 208, 209, 210, 211, 215, 220, 230, 240, 461, 463 Models 129, 140 with stationary heater, code 228	ra83001291165x
4	Check fluid level of engine cooling system, correct if necessary and check corrosion protection as well as antifreeze and correct if necessary	Model 129, 140, 163, 168, 170, 202, 203, 208, 209, 210, 211, 215, 220, 230, 240 Model 463 with engine 112, 113 Models 461, 463 with engines 102, 103, 104, 117, 602, 603, 606, 612, 628	 AP20.00-P-2010GA AP20.00-P-2010G
Danger!	**Risk of accident** caused by vehicle starting off by itself when engine is running. **Risk of injury** caused by contusions and burns during starting	Secure vehicle to prevent it from moving. Wear closed and snug-fitting work clothes. Do not grasp hot or rotating parts.	**AS00.00-Z-0005-01A**

	procedure or when working near engine		
5	Start engine	[i] Allow to run at idle speed until oil pressure is displayed.	
6	Check refrigerant level of air conditioning system	Model 129 up to 31.5.96 with automatic air conditioning, code 581a, Model 140 up to 31.5.95 with automatic air conditioning, code 581a with rear air conditioner, code 582, Model 202 up to 30.9.95 with automatic air conditioning, code 581a, Models 129, 170, 202, 208, 210, 220 with air conditioning (or Tempmatic for USA), code 580	AP83.30-P-8312DA
		Models 461, 463 with air conditioning, code H02	AP83.30-P-8312G
7	Move the pull switch of the hydropneumatic suspension into position N and allow the engine to run at increased idle speed until the vehicle has reached its normal level	Only for Hydropneumatic suspension with automatic level lowering device and controlled damping, code 215c, All-round hydropneumatic suspension, code 487	
8	Brake testing on test stand	Model 129, 140, 170, 202, 203, 208, 209, 210, 215, 220	AP42.00-P-4290BA
		Models 461, 463	AP42.00-P-4290G
9	Check brake disks for signs of corrosion.	[i] For vehicles which were parked for more than 6 months.	
10	Replace brake fluid	[i] For vehicles which were parked for more than 6 months.	
		Model 140 as of 1.7.93 except code 471 Model 170 except code 471 Model 202 up to 31.5.94 except code 471	AP42.00-P-4280BA

		Model 202 with code 472 Model 208 except 208.474 except code 471 Model 210 except code 471 Model 210 except 210.072/272 with code 472 Model 215 with code 472 Model 220 except code Z07	
		Model 129, 140 as of 1.7.93 up to 31.5.94 with code 471	AP42.00-P-4280BB
		Model 129 as of 1.7.93 except code 212/471/472	AP42.00-P-4280BC
		Model 129.059 059/064/ 064 /068	
		Model 202 up to 31.5.94 with code 471	AP42.00-P-4280EA
		Models 461, 463	AP42.50-P-4280G
11 AR	Remove transport film Installing transport foil	Model 168, 461, 463 Models 129, 140, 163, 170, 202, 203, 208, 209, 210, 211, 215, 220, 230, 240 with Paint protection, code 524	**AR97.20-P-4000A**
	Notes on paintwork, decorative and detachable components Notes on transportation sheeting	Model 124, 126, 129, 140, 163, 168, 170, 201, 202, 203, 208, 209, 210, 211, 215, 220, 230, 463	**AH98.00-P-9019-01Z**
		Model 129, 163, 168, 170, 202, 203, 208, 209, 210, 211, 215, 220, 230, 240, 414	**AH97.20-P-9409-03A**
12	Wash the vehicle	Preclean using high pressure or steam cleaning equipment. This will remove any coarse dirt particles.	
13	Remove drips or rough linings on the paintwork, the windows or trim parts	Use metal dust remover or solvent (e.g. pure benzene, silicone remover, artificial-resin thinner). On non-painted plastic parts do not use aggressive	***BR00.45-Z-1017-04A**

		cleaning agents. Only for Activated charcoal filter, code 306: Cover inside of air inlet grille on engine hood. Cleaner	
14	Treat paintwork using polishing paste and buffer	[i] If films still on paintwork. Polish	***BR00.45-Z-1015-04A**
15	Perform treatment using polish and gloss preservation.	Polish Gloss preserver	***BR00.45-Z-1013-04A** ***BR00.45-Z-1014-04A**

Repair materials

Number	**Designation**	**Order number**
BR00.45-Z-1017-04A	Cleaner	A 001 986 13 71
BR00.45-Z-1014-04A	Gloss preserver	A 000 986 44 74
BR00.45-Z-1015-04A	Polish	A 000 986 43 74
BR00.45-Z-1013-04A	Polish	A 000 986 45 74

RETROFITTING & CONVERSION

TABLE OF CONTENTS FOR RETROFITTING AND CONVERTING SPECIAL EQUIPMENT - AN00.10-P-1000NZ

MODEL 163

AN31.10-P-8080AA	Retrofit trailer coupling	Model 163.113 /136 /154 /172 #A as of 145273, Model 163.113 /136 /154 /172 #X as of 708319, Model 163.128 /175 except styling package, code U49	**AN31.10-P-8080AA**
AN31.10-P-8080AB	Retrofit trailer coupling	Model 163.113 /136 /154 /172 #A as of 145273, Model 163.113/136 /154 /172 #X as of 708319, Model 163.128 /175 with styling package, code U49 Model 163.174	**AN31.10-P-8080AB**
AN31.10-P-8080AC	Retrofit trailer coupling	Model 163.136 /154 /172 #A up to 145272, Model 163.136 /154 /172 #X up to 708318	**AN31.10-P-8080AC**
AN91.12-P-0001A	Retrofit third seat row	Model 163.113 /128 /136/154 /157 /172 /175	**AN91.12-P-0001A**

AN91.12-P-0002A	Retrofit third seat row automatic easy entry adjustment facility	Model 163.154/172#A as of 145273 Model 163.136 /154 /172 #X from 708319, Model 163.113 /128 /157 /175 with 3rd seat row, code 847	**AN91.12-P-0002A**
AN20.30-P-0001R	Retrofit coolant preheater	Model 163.136 with engine 111.977	AN20.30-P-0001R
AN20.30-P-0001S	Retrofit coolant preheater	Model 163.154 with engine 112.942	**AN20.30-P-0001S**
AN20.30-P-0001T	Retrofit coolant preheater	Model 163.172 with engine 113.942 Model 163.175 with engine 113.965	**AN20.30-P-0001T**
AN49.10-P-0001A	Retrofit system for diesel particle reduction	Engine 612.963 in model 163 except particulate filter, code 474	AN49.10-P-0001A
AN82.61-P-0001H	Retrofit navigation system Audio 30 APS	Model 163 up to 30.6.99 except 6-disk CD changer, code 819 Model 163 as of 1.7.99 in combination with CD changer with D2B fiber optic cable system	**AN82.61-P-0001H**
AN88.30-P-0001A	Retrofitting fender flap	Model 163.113/136 /154 /172 #A up to 289564 up to 31.8.01 Model 163.113/136 /154 /172 #X up to 754619 up to 31.8.01	**AN88.30-P-0001A**
AN88.30-P-0003A	Retrofitting underride protection	Model 163.113/128/136/154/157/172/175 except styling package, code U49, except Parktronic system (PTS), code 220	**AN88.30-P-0003A**

TABLE OF CONTENTS FOR SUBSEQUENT INSTALLATION AND CONVERSION OF ACCESSORIES - AZ00.10-P-1000JZ

MODELS 163

AZ49.10-P-0002B	Retrofitting AMG end pipe	Engine 111.977 in model 163.136 except modification kit, code U47 except styling package, U49 Engine 112.942 in model 163.154 except modification kit, code U47 except styling package, U49 Engine 112.970 in model 163.157 except modification kit, code U47 except styling package, U49 Engine 113.942 in model 163.172 except modification kit, code U47 except styling package, U49 Engine 113.965 in model 163.175 except	**AZ49.10-P-0002B**

		modification kit, code U47 except styling package, U49 Engine 612.963 in model 163.113 except modification kit, code U47 except styling package, U49 Engine 628.963 in model 163.128 except modification kit, code U47 except styling package, U49	
AZ82.20-P-0001B	Retrofit illuminated door sill molding	Model 163.113/128/136/154/172/174/175	**AZ82.20-P-0001B**
AZ82.64-P-0001MA	Retrofitting CD changer	Model 163 as of 1.7.99 along with Audio 10 radio, Audio 30 or COMAND operating and display unit and D2B fiber optic cable	**AZ82.64-P-0001MA**
AZ82.70-P-0002A	Retrofitting permanently installed D-network telephone	Model 163 up to 30.11.99 Permanently installed Nokia 6081 telephone	**AZ82.70-P-0002A**
AZ82.70-P-0002C	Retrofitting permanently installed D-network telephone	Model 163 as of 1.12.99 up to 31.8.00 Telephone fixed installation Nokia 6090	**AZ82.70-P-0002C**
AZ82.70-P-0002GH	Retrofitting permanently installed D-network telephone	Model 163 from 1.9.00 to 30.9.01 except code 352a, COMAND operating and display unit, fixed-installation Nokia 6090 telephone	**AZ82.70-P-0002GH**
AZ82.70-P-0001A	Retrofit D-network cell phone	Model 163 up to 30.11.99 permanently installed Nokia 3110 cell phone	**AZ82.70-P-0001A**
AZ82.70-P-0001D	Retrofit D-network cell phone	Model 163 as of 1.12.99 up to 31.8.00 Portable CTEL Nokia 3110	**AZ82.70-P-0001D**
AZ82.70-P-0001GH	Retrofit D-network cell phone	Model 163 as of 1.10.01, only for D-network portable CTEL	**AZ82.70-P-0001GH**
AZ88.30-P-0002A	Retrofitting outer spare wheel holder	Models 163.113/128/136/154/172/175, except styling package, code U49	**AZ88.30-P-0002A**
AZ82.60-P-0004A	Retrofit vehicle video system	Models 163.136 /154 /172 1A as of 145273, 163.136/154/172 1X as of 708319, 163.113/128/157/174/175 1# left-hand drive vehicle	**AZ82.60-P-0004A**
AZ82.60-P-0004B	Retrofit vehicle video system	Models 163.136 /154 /172 2A as of 145273, 163.136 /154 /172 2X as of 708319, 163.113/128 /157 /174 /175 2# right-hand drive vehicle	AZ82.60-P-0004B
AZ88.30-P-0006GH	Retrofit side step bar	Models 163.113 /128 /136 /154 /172 /175, except styling package, code U49	**AZ88.30-P-0006GH**
AZ88.30-P-0005GH	Retrofit protective side molding	Models 163.113/128/136/154/172/175, except styling package, code U49	AZ88.30-P-0005GH

AZ82.70-P-0005GH	Retrofit handsfree conversation equipment	Model 163 as of 1.10.99 for Mercedes-Benz hands-free system FSE8	**AZ82.70-P-0005GH**
AZ91.20-P-0001A	Retrofit bracket for child-seat anchorage	Models 163.113 /136 /154 /172 /174	**AZ91.20-P-0001A**
AZ88.30-P-0007GH	Retrofit fender flares	Models 163.113 /154 #A as of 289565, 163.113 #X as of 754620, 163.128 /175 except styling package, code U49	**AZ88.30-P-0007GH**
AZ82.61-P-0002H	Retrofitting Traffic Pro navigation system	Model 163 up to 30.6.00 except sound system, code 810, except 6 disc CD changer, code 819, except MB D-network telephone (D2B), code 316, except D-network portable CTEL (D2B), code 317	**AZ82.61-P-0002H**
AZ82.61-P-0001I	Retrofit TrafficStar navigation system	Model 163 up to 30.6.99 except 6 disc CD changer, code 819	**AZ82.61-P-0001I**
AZ88.30-P-0001A	Retrofit front protection bar	Models 163.113 /154 /172 #A up to 289564, 163.113/154 /172 #X up to 754619, 163.136 except styling package, code U49, except Parktronic system (PTS), code 220a	**AZ88.30-P-0001A**
AZ88.30-P-0001B	Retrofit front protection bar	Models 163.113 /154 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 except styling package, code U49, except Parktronic system (PTS), code 220a	**AZ88.30-P-0001B**
AZ83.70-P-0008A	Retrofitting stationary heater	Models 163.136 1A up to 145272, 163.136 1X up to 708318, 163.154 1A up to 145272, 163.154 1X up to 708318, 163.172 1A up to 145272, 163.172 1X up to 708318	AZ83.70-P-0008A
AZ83.70-P-0008AB	Retrofitting stationary heater	Models 163.136 1A as of 145273 up to 31.8.01, 163.136 1X as of 708319 up to 31.8.01, 163.154 1A as of 145273 up to 31.8.01, 163.154 1X as of 708319 up to 31.8.01, 163.172 1A as of 145273 up to 31.8.01, 163.172 1X as of 708319 up to 31.8.01, 163.113/174 1# up to 31.8.01	AZ83.70-P-0008AB
AZ83.70-P-0008AC	Retrofitting stationary heater	Models 163.113 /136 /154 /157 /172 /174 /175 1# as of 1.9.01 with model year 2002, code 802	AZ83.70-P-0008AC
AZ83.70-P-0008AD	Retrofitting stationary heater	Model 163.128 1# with model year 2002, code 802	AZ83.70-P-0008AD

AZ88.30-P-0008GH	Retrofit styling spoiler	Models 163.113 /154 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 except styling package, code U49	**AZ88.30-P-0008GH**
AZ82.70-P-0006GH	Retrofit portable CTEL	Model 163 as of 1.9.00 up to 30.9.01 portable cellular telephone Nokia 51 xx and 61xx	**AZ82.70-P-0006GH**
AZ83.70-P-0009H	Retrofitting Telestart receiver	Model 163.###1# up to 31.12.99 Telestart T60 with retrofitted stationary heater	AZ83.70-P-0009H
AZ83.70-P-0009HA	Retrofitting Telestart receiver	Model 163.### 1 # Telestart T70 with windshield antenna, with retrofitted stationary heater	AZ83.70-P-0009HA
AZ83.70-P-0009HB	Retrofitting Telestart receiver	Models 163.113 /128 /136 /154 /157 /172 /174 /175 1# as of 1.9.01 with model year 2002, code 802 Telestart T70 with windshield antenna, with retrofitted stationary heater	AZ83.70-P-0009HB
AZ88.30-P-0004GH	Retrofit step platform	Models 163.136 /154 /172 #A as of 145273, 163.136 /154 /172 #X as of 708319, 163.113/128/157/174/175 with illumination	**AZ88.30-P-0004GH**
AZ88.30-P-0004GI	Retrofit step platform	Models 163.113 /128 /136 /154 /157 /172 /174 /175 without illumination	**AZ88.30-P-0004GI**
AZ54.65-P-0001I	Retrofit ultrasonic back-up aid	Model 163.1 up to 31.08.01 except spare wheel holder/spare wheel, code 849, except trailer hitch, code 550	**AZ54.65-P-0001I**
AZ82.10-P-0001GH	Retrofitting additional headlamp	Model 163.113/154 #A as of 289565, 163.113 #X as of 754620, 163.128 /157 /175 except styling package, code U49, except USA version, code 494a. with styling spoiler only	AZ82.10-P-0001GH

CAPACITIES & SPECIFICATIONS

SPECIFIED ENGINE OILS (SERVICE) - OVERVIEW - BB00.40-P-0223-02A

For Mercedes-Benz and Smart

BB00.40-P-0223-02A	**Specified engine oils (service) - overview**	**For Mercedes-Benz and Smart**	**Sheet 223.2**
	viscosity classes	Sheet 224.1 (passenger-car engines)	BB00.40-P-0224-01A

		Sheet 224.2 (commercial-vehicle engines)	BB00.40-P-0224-02A
	Single-grade oils	Sheet 228.0 Sheet 228.2	BB00.40-P-0228-00A BB00.40-P-0228-02A
	Multigrade oils	Sheet 226.9 Sheet 228.1 Sheet 228.3 Sheet 228.5 Sheet 228.51 Sheet 229.1 Sheet 229.3 Sheet 229.31 Sheet 229.5 Sheet 229.51	BB00.40-P-0226-09A **BB00.40-P-0228-01A** **BB00.40-P-0228-03A** BB00.40-P-0228-05A BB00.40-P-0228-51A **BB00.40-P-0229-01A** **BB00.40-P-0229-03A** BB00.40-P-0229-31A **BB00.40-P-0229-05A** BB00.40-P-0229-51A

The temperature ranges in the viscosity classes must be observed for the use of the engine oils (see Sheets 224.1 and 224.2)!

Passenger vehicle engines,

Commercial vehicle engines from the passenger car division,

Single-grade oils are listed on sheets: 228.0, 228.2 - only to be used in summer.

Multigrade oils are listed on sheets 226.9, 228.1/.3/.5/.51, 229.1/.3/.31/.5/.51 - use possible all year round.

Industrial engines from the car sector (series 100, series 600)

MB Specifications for Operating Fluids Sheet 1	**226.9 Multi-grade**	**228.0/.1 Single/ multi-grade**	**226.9229.3 Single/ multi-grade**	**229.5 Multi-grade**	**229.5 Multi-grade**	**229.5 Multi-grade**	**229.3 Multi-grade**	**229.3229 Multi-grade**	**229.5 Multi-grade**	**229.5 Multi-grade**
Gasoline engines										
M 155 (SLR)	-	-	-	-	-	-		-	•	-
AMG engines except M 155 (SLR)	-	-	-	-	-	-	-	-	•[4] .)	-
M 111, 137, 272, 273	-	-	-	-	-	•	•	-	•	-
M 112, 113, 134, 135	-	-	-	-	-	•	•	•	•	•
M 122, 275	-	-	-	-	-	-	•	-	•	-

M 160, 160/1, M 285 (Maybach)	-	-	-	-	-	-	-	-	•	-
M 166	-	-	-	-	-	•	•	-	-	-
M 266 Turbo, M 271	-	-	-	-	-	-	•	•	•	•
Other M 1xx, M 2xx that are not listed above	-	-	-	-	-	•	•	-	•	-
Diesel engines										
without particulate filter (DPF)										
OM660	-	-	-	•	-	-	-	-	•	-
OM 640, 642, 646 in model series 639 OM 646, 647, 648	-	-	-/•	•	•	-	•	•	•	•
OM611, 612, 613, 628, 639, 668, 664, 665	-	-/•	-/•	•	•	•	•	•	•	•
Other OM 6xx not listed above	-	-/•	-/•	•	•	•	•	•	•	•
with particulate filter (DPF)										
OM 629, 639, 640, 646, 647, 648, 664, 665 OM 639 in model series 639 and 906	-	-	-	-	•	-	-	•	-	•
OM 660 (EU3/EU4 not with regulated DPF)	-	-	-	•	-	-	-	-	•	-
Other OM 6xx with DPF not listed above	-	-	-	-	•	-	-	•	-	•

Commercial vehicle engines, Industrial engines from the commercial vehicle sector (BR 300, BR 400, BR 500, BR 900)

MB Specifications for Operating Fluids Sheet 1.)	226.9 Multi-grade	228.0/.1 Single/ Multi-grade	226.9229.3 Single/ Multi-grade	229.5 Multi-grade	228.51 ' Multi-grade	229.1 Multi-grade	229.3 Multi-grade	229.31 Multi-grade	229.5 Multi-grade	229.51 Multi-grade
Commercial vehicles, buses without particulate filter										
BR 300, 400, 500, 900; OM 457, 460 up to and including Euro 3	-	o/•	o/•	•	•	-	-	-	-	-
BR 500, 900; OM 457, 460 Euro 4/5	-	-	o/•	•	•	-	-	-	-	-
Gas engines	•	-	-	-	•	-	-	-	-	-
Commercial vehicles, buses with particulate filter										
BR 500, 900; OM 457, 460	-	-	o	o	•	-	-	-	-	-

This table only serves as an overview!

The detailed maintenance and oil change regulations can be found in the maintenance booklet for the respective vehicle/ major assembly.

• Enable

o Can only be used in exceptional cases or under certain operating conditions/in certain applications.

- Must not be used

1. Sheets 227.0/. 1 no longer exist! Replaced by engine oils in sheets 228.0/. 1/.2/.3/.5/51.
2. Use in combination with low-sulfur (S <50 ppm) or sulfur-free (S <10 ppm) fuel! If fuels with sulfur contents of S> 500 ppm are being used, the oil change intervals must be reduced!
3. **Restriction:** Only "Mobil 1 5W-50", SAE 5W-50, sheet 229.3 is approved!

4. **Restriction:** Only engine oils SAE XW-40 may be used!

MULTIGRADE ENGINE OILS (SHEET 228.1) - BB00.40-P-0228-01A

i **For use in vehicles/engines refer to ? Sheet 223.2**

Product name	10W-30	10W-40	15W-40	20W-40	20W-50	Customer, town/country
Addinol Super star MX 1547			X			Addinol Lube Oil GmbH, Leuna, Germany
ad-Mehrbereichs-Oil			X			Carat GmbH & Co. KG, Eschborn, Germany
Adnoc Engine Oil XD3+ Multi			X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc HPSD Engine Oil			X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
Agip Master Superturbo S.H.P.D.			X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip SIGMA Superdiesel Multigrade			X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Universal Extra			X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Universal Multifleet			X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agronil HD-Super C-S3			X			A.G. Rohrl GmbH & Co., Weiden, Germany
Alpha Juan 7000					X	Axcl Gulf FZE, Sharjah/United Arab Emirates
Alpine RST Super			X			Mitan Mineralol GmbH, Ankum, Germany
Amalie Diesel Turbo			X			Amalie Petroquimica S.A., Madrid, Spain
Antar Grapholia MS Multigrade			X			Total Lubrifiants, Paris la Defense Cedex, France
Antar Traxolia Z 15W-40			X			Total Lubrifiants, Paris la Defense Cedex, France
Aral MultiTurboral			X			Aral Aktiengesellschaft, Hamburg, Germany
Argon-Hochleistungs-Mehrbereichsol			X			Voitlander GmbH & Co. KG, Kronach, Germany

Argus Multi Fleet			X			Hemco, Belgrade/Serbia
Aristokrat Motorol Super KTX turbo HD			X			Muller Mineralole Handels- und Beratungsgesellschaft mbH, Eschweiler/Germany
Ashland A.P.B. Turbo Guard MDX			X			Ashland Nederland B.V., AA, Dordrecht/Netherlands
A-SR-Premium			X			Scientific-technical centre "Khimmotologia", Korolev, Russia
Astris Motor Oil MF			X			Astris S.A., Giornico, Switzerland
Autol Spezial CPM HD S3			X			Agip Schmiertechnik GmbH, Wurzburg, Germany
Avia Multi CFE		X				Avia Mineralol-AG, Munich, Germany
Avia Multi HDC Extra			X			Avia Mineralol-AG, Munich, Germany
Aviatic Super Multigrade			X			Wilhelm Scholten GmbH, Munster, Germany
Aviaticon Unique D			X			Finke Mineralolwerk GmbH, Visselhovede/Germany
Axle King			X			Beijing Tongyi Petroleum Chemical Co., Ltd, Beijing, P.R. China
BayWa Motorenol Universal HD 1040 MC		X				BayWa AG, Munich, Germany
BayWa Super Multisyn SL		X				BayWa AG, Munich, Germany
BayWa Universal HD 1040 MC		X				BayWa AG, Munich, Germany
BP Leichtlauf-Motorenoel 1040		X				BP p.l.c., London, England
BP Vanellus C4 Global			X			BP p.I.c., London, England
BP Vanellus C5 Global			X			BP p.I.c., London, England
BP Vanellus C6 Classic			X			BP p.I.c., London, England
BP Vanellus Multigrade			X			BP p.I.c., London, England
BP Vanellus Super V Turbo			X			BP p.I.c., London, England
Caltex Delo 350			X	X	X	ChevronTexaco Technology

Multigrade						Ghent, Ghent/Zwijnaarde, Belgium
Carl Mehrbereichs-Motorenol Multi			X			Coparts Autoteile GmbH, Essen, Germany
Cartechnic Motorenol			X			Wessels + Muller AG, Osnabruck, Germany
Castrol Assuron Max			X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Assuron T Max			X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Myndio Plus			X			Castrol Limited, GB Reading RG8 7QR, England
Castrol RX Super Max			X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection Medium Duty 15W-40			X			Castrol Limited, GB Reading RG8 7QR, England
Cepsa Supermultigrado SHPD			X			Cepsa Lubricantes, S.A., Madrid, Spain
CLAAS Engine			X			CLAAS Vertriebsgesellschaft mbH, Harsewinkel, Germany
CONCEP-Tech GDX			X			Swd Lubricants GmbH & Co. KG, Duisburg, Germany
Condat Vicam Turbo LD			X			Condat S.A., Chasse-sur-Rhone, France
Consol Titan Transit			X			Vial Oil Ltd., Moscow, Russia
Crown Super Ultra Diesel			X			Emirates Lube Oil Co. Ltd., Sharjah/United Arab Emirates
Diesel Ultra			X			Pemco Kuras, Kleipeda, Lithuania
Dislub Super			X			Diator de Mexico, S.A. de C.V., Leon, Guanajuato, Mexico
Divinol Multimax HD C3			X			Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol turbo			X			Zeller + Gmelin GmbH & Co., Eislingen, Germany
Dolomiti Super HD			X			Conqord Oil S.r.l., Lacchiarella (Ml), Italy
Duplex CDX 15/40			X			Morris & Co. Ltd., Shrewsbury, England
EKO Forza			X			EKO A.B.E.E., Athens/Greece

Elf Disola W			X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance 3D Multigrade			X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Super D			X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Super Multigrade			X			Total Lubrifiants, Paris la Defense Cedex, France
Ellmotol HD Super C3			X			Eller-Montan-Comp. GmbH, Duisburg, Germany
Ellmotol HD Super GT			X			Eller-Montan-Comp. GmbH, Duisburg, Germany
Emo Turbo Champion Plus SAE 15W-40			X			Motor Oil (Hellas), Maroussi, Greece
Emo Turbo Champion Plus SAE 20W-50				X		Motor Oil (Hellas), Maroussi, Greece
Energomax Extra			X			Energoinvest-Proizvodnja Maziva ddo, Sarajevo, Bosnia-Herzegovina
ENOC Vulcan 550X 15W-40			X			ENOC International Sales L.L.C., Dubai/United Arab Emirates
ENOC Vulcan 660X 15W-40			X			ENOC International Sales L.L.C., Dubai/United Arab Emirates
Ergo Diesel Plus			X			ERG Petroli SpA, Savona, Italy
Ertoil Multirruta TD SHPD			X			Cepsa Lubricantes, S.A., Madrid, Spain
ESA Multilub 2004			X			ESA, Burgdorf, Switzerland
Essolube XT 3 15W-40			X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XT 301			X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XTS 301		X				Exxon Mobil Corporation, Fairfax, Virginia, USA
Eurol Uni			X			Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Evva Multi GFP			X			Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
Fenix Super			X			NIS Fabrika maziva, Krusevac/Serbia

Fina Kappa Supra			X			Total Lubrifiants, Paris la Defense Cedex, France
Fina Kappa Turbo DI		X	X			Total Lubrifiants, Paris la Defense Cedex, France
Forol Unimax 15W40			X			Patting d.o.o., Varazdin, Croatia
Fuchs Titan LD Extr		X				Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Universal HD 15W-40			X			Fuchs Petrolub AG, Mannheim, Germany
Galax Unia			X			Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galp Formula D 2000			X			Petrogal S.A., Lisbon, Portugal
Galp Galaxia Super 15W40			X			Petrogal S.A., Lisbon, Portugal
Gedol Yes Turbo			X			Gedol International S.r.l., Cerreto Guidi (FI), Italy
Gerina Super Diesel			X			Nova Plama Trading, Pleven, Bulgaria
Gonher Super Fleet MB-1			X			Gonher de Mexico, S.A. de C.V., Santa Catarina, N.L., Mexico
Greatwall Flying Tiger			X			Greatwall Lube Oil Co. Sinopec, Beijing, P. R. China
Gulf Multi Duty (EP)			X			S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Multitrailer			X			S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Superfleet			X			Gulf Oil International, London, England
Gulfleet Multitrailer			X			S.A. Espanola de Lubrificantes, Madrid, Spain
Habarah Excel			X			Khaleej Lube Oil Company, Ahmadi, Kuwait
Hafa Multidex 500			X			Hafa, Paris, France
Hafa Multigrade TD			X			Hafa, Paris, France
HAI PAI Heavy Duty Diesel Engine Oil			X			Shanghai Oil Refinery, Pudong, Shanghai, P. R. China
Hercules HTF			X			FL Selenia s.p.a., Villastellone (Torino), Italy

Hercules Turbo Special			X		X	FL Selenia s.p.a., Villastellone (Torino), Italy
Hessol Superior			X			Hessische Oelwerke, Bad Vilbel, Germany
Hunold Turbo Star			X			Hunold Schmierstoffe GmbH, Eching, Germany
ICPA Extra Universal			X			ICPA, Dordrecht, Netherlands
Igol Trans Turbo 4X			X			Igol France, Amiens Cedex/France
INA Super 5			X			INA Maziva Rijeka, Rijeka, Croatia
Inter TRX2			X			Ets A. Mauran & Fils S.A., Odars, France
Intercooler 400			X			Unil S.A., Saumur, France
Intercooler 450			X			Unil S.A., Saumur, France
IP Super Motor Oil Multigrade			X			Italiana Petroli (IP), Genoa/Italy
Kajo Multigrade Turbo Engine Oil HD			X			Kajo-Chemie GmbH, Anrochte, Germany
Kompressol-Ultralub C SAE 15W-40			X			Kompressol-Oel Verkaufs GmbH, Cologne, Germany
LEOL-Premium			X			Lebedyn Oil Processing Plant Ltd., Lebedyn, Sumy reg., Ukraine
Liqui Moly Formula 3 Protech			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly MB Service Fill Motor Oil			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Nova Super			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Nova Super HD Motorol			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Touring			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech Diesel Spezialoil			X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring			X			Liqui Moly GmbH, Ulm,

High Tech Motoroil HD						Germany
Lotos Diesel 3			X			Grupa Lotos SA., Gdansk, Poland
Lubex Turbo SD 15W40			X			Belgin Madeni Yaglar Tic. Ve San. A.S., Gebze Kocaeli,
Turkey Lubral Super Diesel MB-I			X			Lubricantes de America, S.A. de C.V., Santa Catarina, N.L., Mexico
Lubrifin Ultra Motor Oil			X		X	S.C. Lubrifin S.A., Brasov, Rumania
Lukoil Super			X			OAO LUKOIL, Moscow, Russia
Lukoil Super N			X			OAO Lukoil-Nizhegorodnefteorgsintez, Kstovo, Nizhni Nowgorod Region, Russia
Lukoil Super-V			X			OAO LUKOIL, Moscow, Russia
Lukoil - Super			X			OAO LUKOIL, Moscow, Russia
Madit Turbo			X			Slovnaft, a.s., Bratislava 23, Slovakia
Madit Turbo Plus			X			Slovnaft, a.s., Bratislava 23, Slovakia
Maxidiesel			X			Verkol, S.A., Bera/Navarra, Spain
Meditran SC			X			PT Pertamina (Persero), Jarkarta/Indonesia
megol Motorenoel HD-C3			X			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
megol Motorenoel Universal			X			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
Meister-ol Hochleistungs-Motorenol			X			Deutsche BP Aktiengesellschaft, Hamburg, Germany
MHG Oil Unitop			X			MHG, Sulzbach-Rosenberg, Germany
Midland XHD			X			Oel-Brack AG, Hunzenschwil, Switzerland
Migrol HD Motor Oil S3		X	X			Migrol-Genossenschaft, Zurich, Switzerland

Migrol HD Motor Oil Superlife Special			X			X Migrol-Genossenschaft, Zurich, Switzerland
Mobil Delvac Super 1300 15W-40			X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mogul Diesel DT			X			Paramo, a.s., Pardubice, Czech Republic
MOL Turbo Diesel			X			MOL-LUB Ltd., Almasfuzito /Hungary
Motor Gold Normtec SAE 15W-40			X			Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Motorex Cobra 1040		X				Bucher AG Langenthal, Langenthal/Switzerland
Motorex Cobra 1540			X			Bucher AG Langenthal, Langenthal/Switzerland
Motorex Topaz			X			Bucher AG Langenthal, Langenthal/Switzerland
Motul Tekma Supra 15W-40			X			Motul, Aubervilliers/France
Motul Tekma Supra 20W-50					X	Motul, Aubervilliers/France
Multiturbo Plus			X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-
Madrid, Spain National Super Ultra Diesel			X			Emirates Lube Oil Co. Ltd., Sharjah/United Arab Emirates
National Ultra Diesel			X			Emirates Lube Oil Co. Ltd., Sharjah/United Arab Emirates
New Process SHPD			X			New-Process AG, Tubach SG, Switzerland
Oest Gigant Universal HD Motorol			X			Georg Oest Mineralolwerke GmbH & Co KG, Freudenstadt/Germany
Olmaline Plus			X			OLMA d.d., Ljubljana, Slovenia
oMV control			X			OMV Refining & Marketing GmbH, Vienna, Austria
oMV truck CF			X			OMV Refining & Marketing GmbH, Vienna, Austria
OMV truck M plus SAE 15W-40			X			OMV Refining & Marketing GmbH, Vienna, Austria

Optimol Optilub Longlife			X			Castrol Industrie GmbH, Monchengladbach, Germany
Original Tetra			X			Shenyang Original Finechemicals Co., Shenyang, P. R. China
ORLEN OIL Diesel (2) HPDO CG-4/SJ 15W/40			X			Orlen Oil Sp. z o.o., Krakow, Poland
ORLEN OIL Diesel (2) HPDO CG-4/SJ 20W/50					X	Orlen Oil Sp. z o.o., Krakow, Poland
Orly Stratus 3002			X			Orly International, Vieux-Thann, France
Orly Stratus 3002 Z			X			Orly International, Vieux-Thann, France
Orly Stratus 3004			X			Orly International, Vieux-Thann, France
Panolin Universal FEO			X			Panolin AG, Madetswil, Switzerland
Parnas Evo Super			X			Sakson S.A., Athens, Greece
Pazmular DB			X			Paz Lubricants & Chemicals Ltd., Haifa, Israel
Pennasol Multigrade Extra E			X	X		Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Pennzoil Long-Life			X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Pennzoil Long-Life 2000			X		X	Pennzoil-Quaker State, Houston, Texas 77002, USA
Pennzoil Long-Life 2000 Motor Oil			X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Petromin Turbodiesel C 15W40			X			Petromin Oils, Jeddah/Saudi Arabia
PO Turbo Dizel S			X			Petrol Ofisi Anonim Sirketi, Istanbul, Turkey
Prista Leader 20W50					X	Prista Oil Ltd., Rousse, Bulgaria
Proton diesel			X			Petrol d.d., Ljubljana, Slovenia
Pyroil Extra motor oil SAE 15W-40			X			The Valvoline Company, Lexington, Kentucky, USA
Q8 T 500			X			Kuwait Petroleum, Hoogvliet RT, Netherlands

QS Serie III Multigrade			X			Commercial Importadora S.A., Mexico, D.F., Mexico
Quaker State HDX			X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Ravenol Formel Super Mineraloel Diesel			X			Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Rektol Turbo Hochleistungsoel			X			Karl Pohlmann, Korbach, Germany
Repsol Multi G Diesel			X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Rexol HD Super			X			JSC Ryazan Refinery, Ryazan, Russia
Roils Turbo 15W40			X			JSC Ryazan Refinery, Ryazan, Russia
Scope Denim 2070			X			United Grease & Lubricants L.L.C., Ajman/United Arab Emirates
Shell Rimula D Extra			X		X	Shell International Petroleum Co., London, England
Shell Universal Engine Oil			X			Shell International Petroleum Co., London, England
SibiMotor Extra-5			X			OAO Sibneft Omsk Refinery, Omsk/Russia
SibiMotor Premium Diezel-5			X			OAO Sibneft Omsk Refinery, Omsk/Russia
Sips-Multi-Plus-HD			X			Sips-Dieter Docker GmbH, Viersen, Germany
SPC SDM 801			X			Singapore Petroleum Co. Ltd., Singapore
SPC SDM 803			X			Singapore Petroleum Co. Ltd., Singapore
Statoil PowerWay 10W-30	X					Svenska Statoil AB, Stockholm, Sweden
Statoil PowerWay 15W-40			X			Svenska Statoil AB, Stockholm, Sweden
Statoil RoadWay			X			Statoil Lubricants Technologies Sp. Z o.o., Krakow, Poland
Sudol Extra HDC			X			Sudol Mineralol-Raffinerie GmbH, Eislingen, Germany
Sudol Recycling Super Motorol			X			Sudol Mineralol-Raffinerie GmbH, Eislingen, Germany

turbo						
Sunoco Forza			X			Sun Oil Co. (Belgium) N.V., Aartselaar, Belgium
Super Diesel Oil MB-1			X			Bardahl de Mexico, Mexico, D.F., Mexico
Super Speed 3S Diesel			X			Statoil Lubricants Technologies Sp. Z o.o., Krakow, Poland
Super Universal 15W-40			X			Raiffeisen Central-Genossenschaft Nordwest eG, Munster, Germany
Super diesel			X			Conqord Oil S.r.l., Lacchiarella (MI), Italy
swd Primus GDX			X			Swd Lubricants GmbH & Co. KG, Duisburg, Germany
Tamoil Extra Diesel Turbo			X		X	Tamoil Petroli S.p.A., Milan, Italy
Tamoil Formula Turbo Diesel (I)			X			Tamoil Petroli S.p.A., Milan, Italy
Teboil Power Plus			X			Oy Teboil AB, Suomen Petrooli Oy, Hamina/Finland
Tedex Diesel Truck Motor Oil			X			Tedex Vertriebs GmbH, Berlin, Germany
Tedex Multifleet FE Motor Oil			X			Tedex Vertriebs GmbH, Berlin, Germany
TERRA REC Multigrade Extra E			X		X	Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Texaco Ursa Super LA Multigrade			X		X	Chevron Texaco Technology Ghent/Gent, Zwijnaarde, Belgium
Top Lube Supreme Performance DEO			X			ABS Lubricants, Abu Dhabi/United Arab Emirates
Top			X			Turbo X Muller Mineralole Handels-und Beratungsgesellschaft mbH, Eschweiler/Germany
Tor Mixfleet Ultra			X			De Oliebron B.V., Zwijndrecht, Netherlands
Total Rubia 4400			X			Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia XT			X			Total Lubrifiants, Paris la Defense Cedex, France
Triathlon Diesel			X			Adolf Wurth GmbH & Co.

						KG, Kunzelsau, Germany
Trysk Super Turbo			X			Paramo, a.s., Pardubice, Czech Republic
Tutela Trukker Turbo			X		X	FL Selenia s.p.a., Villastellone (Torino), Italy
Ultsch Oel Multigrade			X		X	Georg Ultsch GmbH, Weismain, Germany
Unil Multi D			X			Unil Germany GmbH, Stuttgart, Germany
Universal			X			Universal Lubricants Factory (Zinol) L.L.C., Sharjah/United Arab Emirates
Urania Turbo			X		X	FL Selenia s.p.a., Villastellone (Torino), Italy
Uranus			X			C.F.C.L., Merignac/France
Ursa Serie 5 ED			X			Productos Texaco S. A. de C. V., Mexico, D.F., Mexico
Ursa Super DMO			X			ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Ursa Super LA Multigrade			X		X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Ursa Super Plus 15W40			X			Productos Texaco S. A. de C. V., Mexico, D.F., Mexico
Valvoline All Fleet Plus	X	X	X		X	The Valvoline Company, Lexington, Kentucky, USA
Valvoline Diesel Turbo motor oil			X			The Valvoline Company, Lexington, Kentucky, USA
Valvoline High Performance motor oil			X			The Valvoline Company, Lexington, Kentucky, USA
Valvoline Turbo V	X	X	X		X	The Valvoline Company, Lexington, Kentucky, USA
Vanguard 15W40			X			Greenway Lubricants Limited, Wednesbury, West Mid, England
Vat Turbo Plus			X			VATOIL Europe, Oisterwijk/Netherlands
Veco Super Turbo Diesel			X			Przedsiebiorstwo Modex-Oil, Kwidzyn, Poland
Veco Turbo Diesel			X			Przedsiebiorstwo Modex-Oil, Kwidzyn, Poland
Veritas Super			X			Oelwerke Julius Schindler

Turbo 2000						GmbH, Hamburg, Germany
Veritas Super Turbo HD			X			Oelwerke Julius Schindler GmbH, Hamburg, Germany
Versus			X		X	S.C. Lubrifin S.A., Brasov, Rumania
Versus Plus			X			S.C. Lubrifin S.A., Brasov, Rumania
ViscoClass A+			X			Viscolube Italiana S.p.A., Pieve Fissiraga (LO), Italy
Wintershall Magnum Turbo			X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall Multi-Rekord			X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall Primalub 15W-40			X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wunsch Record Multi HD-E2			X			Wunsch ole GmbH, Ratingen, Germany
Yacco Transpro 25			X			Yacco SAS, St Pierre Les Elbuf/France
Yacco Transpro 30 15W40			X			Yacco SAS, St Pierre Les Elbuf/France

MULTIGRADE ENGINE OILS (SHEET 228.3) - BB00.40-P-0228-03A

i **For use in vehicles/engines refer to ? Sheet 223.2**

Product name	**10W-30**	**10W-40**	**15W-30**	**15W-40**	**20W-40**	**20W-50**	**Customer, town/country**
76 Guardol QLT				X			ConocoPhillips, Costa Mesa, CA, USA
76 Royal Triton QLT				X			ConocoPhillips, Costa Mesa, CA, USA
A.P.B. Super Turbo SHPD DDE				X			Ashland Nederland B.V., AA, Dordrecht/Netherlands
AD XTD ECO PLUS				X			AD Parts, S.L., Riudellots de la Selva (Girona), Spain
ad-Cargo Leichtlauf-Oil		X					Carat GmbH & Co. KG, Eschborn, Germany
Addinol Diesel Longlife MD 1547				X			Addinol Lube Oil GmbH, Leuna, Germany
Addinol Diesel Longlife MD 1548				X			Addinol Lube Oil GmbH, Leuna, Germany
Addinol Diesel Power				X			Addinol Lube Oil GmbH,

MD 1547							Leuna, Germany
Addinol Premium Star MX 1048		X					Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super Longlife MD 1047		X					Addinol Lube Oil GmbH, Leuna, Germany
Adnoc Extra Super Engine Oil				X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc Extra Super Plus Engine Oil				X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc Global Ultra Engine Oil SAE 10W40		X					Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc SHPD Engine Oil				X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
ad-SHPD Truck Oil				X			Carat GmbH & Co. KG, Eschborn, Germany
Agip All Guard Motor Oil				X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Blitum T				X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sigma TFE		X					ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sigma Truck				X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sigma Turbo				X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Akron Ultra Clear CI-4				X			Mexicana de Lubricantes, S.A. de C.V., Guadalajara, Mexico
Aktual Multi				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Alpine RST Super plus 15 W 40				X			Mitan Mineralol GmbH, Ankum, Germany
Amalie Superturbo Diesel SHPD				X			Amalie Petroquimica S.A., Madrid, Spain
Amalie/APSA Diesel				X			Amalie Petroquimica S.A.,

Lander 15W-40							Madrid, Spain
AMBRA MASTERGOLD HSP 10W-30	X						FL Selenia s.p.a., Villastellone (Torino), Italy
Antar Antelia FE 10W30	X						Total Lubrifiants, Paris la Defense Cedex, France
Antar Dexelia FE 15W -30			X				Total Lubrifiants, Paris la Defense Cedex, France
Antar Grapholia TX				X			Total Lubrifiants, Paris la Defense Cedex, France
Aral ExtraTurboral		X					Aral Aktiengesellschaft, Hamburg, Germany
Aral PlusTurboral				X			Aral Aktiengesellschaft, Hamburg, Germany
Argon-Hochleistungs-Dieselmotorenol SHPD				X			Voitlander GmbH & Co. KG, Kronach, Germany
Argon-Leichtlaufol 10W40 SHPD		X					Voitlander GmbH & Co. KG, Kronach, Germany
Argus Long Life				X			Hemco, Belgrade/Serbia
Armorine Multigrade SHPDO Super S3				X			Armorine S.A., Lanester Cedex, France
Astris Motor Oil LDX				X			Astris S.A., Giornico, Switzerland
Astris Motor Oil LDX Plus		X					Astris S.A., Giornico, Switzerland
Astris Motor Oil Universal		X					Astris S.A., Giornico, Switzerland
Autol Valve SHP				X			Agip Schmiertechnik GmbH, Wurzburg, Germany
Autol Valve Turbo FE		X					Agip Schmiertechnik GmbH, Wurzburg, Germany
Autol Valve Turbo FE Plus		X					Agip Schmiertechnik GmbH, Wurzburg, Germany
Avia Multi CFE Plus		X					Avia Mineralol-AG, Munich, Germany
Avia Multi HDC Plus				X			Avia Mineralol-AG, Munich, Germany
Avia Turbosynth CFE				X			Avia Mineralol-AG, Munich, Germany
Aviatic Super SHPD				X			Wilhelm Scholten GmbH, Munster, Germany

Aviaticon Turbo				X			Finke Mineralolwerk GmbH, Visselhovede/Germany
Aviaticon Turbo D 10W-40		X					Finke Mineralolwerk GmbH, Visselhovede/Germany
Aviaticon Turbo-Super 15W-40				X			Finke Mineralolwerk GmbH, Visselhovede/Germany
BayWa Motorenol HDC 1540				X			BayWa AG, Munich, Germany
BayWa Motorenol Rennklasse Turbo 2000		X					BayWa AG, Munich, Germany
BayWa Motorenol Super Truck 1540				X			BayWa AG, Munich, Germany
BayWa Motorenol Turbo 4000		X					BayWa AG, Munich, Germany
Behran Motor Oil SHPD				X		X	Behran Oil Company, Teheran - Iran
Behran Turbo Diesel SHPD				X			Behran Oil Company, Teheran - Iran
Bell Super Long - Protec				X			Bell chemicals, Banatsko Veliko Selo/Serbia
Blasol 15W40				X			Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
Blasol MHP 10W40		X					Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
Blasol MHP 15W40				X			Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
BP Spezial CRT		X					BP p.I.c., London, England
BP Vanellus C6 Extra				X			BP p.I.c., London, England
BP Vanellus C6 Global				X			BP p.I.c., London, England
BP Vanellus C6 Global Plus		X					BP p.I.c., London, England
BP Vanellus C7 Global		X					X BP p.I.c., London, England
BP Vanellus E6				X			BP p.I.c., London, England

BP Vanellus Multi-Fleet				X			Lubricants UK Ltd, Technology Centre, Reading/England
Brad Penn Euro-Diesel LD				X			American Refining Group, Bradford PA, USA
Buck				X			Fujian Laike Petrochemical Co., Ltd., Nan An City, Fujian Province, 362321, P. R. China
Burgan Diesel CH-4				X			Kuwait National Petroleum Company, Kuwait, Kuwait
Calpam Truck FE		X					Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Calpam Turbofleet				X			Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Caltex Delo 400 Multigrade				X			ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Caltex Delo Gold (ISOSYN) Multigrade				X			Caltex International Technical Center Pty Ltd, Australia
Caltex Delo Gold Multigrade, SAE 15W-40				X			ChevronTexaco Global Lubricants, Asia Pacific, Sydney, NSW 2000/Australia
Caltex Delo SHP Multigrade				X			ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Campsa Turbo THPD				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Carl Motorenol SHPD NKW				X			Coparts Autoteile GmbH, Essen, Germany
Carl Motorenol Truck		X					Coparts Autoteile GmbH, Essen, Germany
Castrol CRT Extra		X					Castrol Limited, GB Reading RG8 7QR, England
Castrol RX Super				X			Castrol Limited, GB Reading RG8 7QR,

							England
Castrol RX Super Plus				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Syndio Plus				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tectio Euro 4				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection		X					X Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection 1040		X					Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection Max				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection Plus				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection S				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection T				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Tection T Plus				X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Turbomax				X			Castrol Limited, GB Reading RG8 7QR, England
Cepsa Diesel Turbo SHPD				X			Cepsa Lubricantes, S.A., Madrid, Spain
Cepsa Euromax				X			Cepsa Lubricantes, S.A., Madrid, Spain
Cepsa Ultra SHPD				X			Cepsa Lubricantes, S.A., Madrid, Spain
Champion Turbofleet SHPD				X			Wolf Oil Corporation N.V., Hemiksem, Belgium
Chemoleums Turbo SHPD					X		Chemoleums Limited, Chrompet, Chennai, India
Chevron Delo 400 Euro				X			ChevronTexaco

HDMO							Technology Ghent, Ghent/Zwijnaarde, Belgium
Chevron Delo 400 Multigrade				X			ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Chevron RPM Heavy Duty Motor Oil				X			ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Citgo Citgard MB				X			Citgo International Latin America, Inc., Caracas, Venezuela
CLAAS AGRIMONT SDX 15W-40				X			CLAAS Vertriebsgesellschaft mbH, Harsewinkel, Germany
CLAAS Engine Top				X			CLAAS Vertriebsgesellschaft mbH, Harsewinkel, Germany
Classic Motorenol Plus		X					Christian Luhmann GmbH & Co. KG, Hoya, Germany
Classic Motorenol TD				X			Christian Luhmann GmbH & Co. KG, Hoya, Germany
Cofran Sintolux LD 10W-40		X					Fuchs Petrolub AG, Mannheim, Germany
Comma Super Diesel Oil 15W40				X			Comma Oil & Chemicals Ltd, Gravesend, Kent DA 122QX, England
CONCEP-TECH DIESEL SAE 10W40		X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
Condat Vicam Euro Turbo Exel				X			Condat S.A., Chasse-sur-Rhone, France
Condat Vicam Exel 10W40		X					Condat S.A., Chasse-sur-Rhone, France
Condat Vicam Runner 10W40		X					Condat S.A., Chasse-sur-Rhone, France
Consol Premium				X			Vial Oil Ltd., Moscow, Russia
CPC Superfleet CH4 Motor Oil				X			Chinese Petroleum Corporation, Kaoshiung, Taiwan 806, Taiwan

CPC Superfleet E3 Synthetic Oil				X			Chinese Petroleum Corporation, Kaoshiung, Taiwan 806, Taiwan
CS Turbogrado				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
CS Turbogrado Extra				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Cyclon D Super				X			Cyclon Hellas S.A., Maroussi, Greece
Cyclon D1 SHPD				X			Cyclon Hellas S.A., Maroussi, Greece
Delkol super diesel 15W40				X			Delek, Natanya, Israel
Delkol Turbo engine				X			Delek, Natanya, Israel
Diesel Exclusive XFE				X			Millers Oils Ltd., Brighouse West Yorkshire, England
Diesel Special Benz M&A				X			M & A Oil Co. de Mexico, S.A. de C.V., Mexico, D.F., Mexico
Dislub Premium				X			Diator de Mexico, S.A. de C.V., Leon, Guanajuato, Mexico
Distance Oil Long Life				X			Zupljanka Zupa, Blace/Serbia
Divinol Multimax Extra		X					Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol Multimax High Tech 15W-40				X			Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol Multimax Top				X			Zeller + Gmelin GmbH & Co., Eislingen, Germany
DLUB MB 15W40				X			Distribuidora de Aceites Mexicanos, ACEIMEX, S.A. de C.V., Tultilan, Mexico City, Mexico
Dolomiti-T				X			Conqord Oil S.r.l., Lacchiarella (MI), Italy
Dragon Turbo Best				X			S-Oil Corporation, Seoul, Rep. of Korea
Duron				X			Petro-Canada Lubricants, Mississauga, Ontario, Canada

Duron XL Synthetic Blend				X			Petro-Canada Lubricants, Mississauga, Ontario, Canada
Econo-Veritas HDE		X					Oelwerke Julius Schindler GmbH, Hamburg, Germany
Econo-Veritas HDE Plus		X					Oelwerke Julius Schindler GmbH, Hamburg, Germany
EKO Petron				X			EKO, A.B.E.E., Athens/Greece
Eldon's SHP Diesel				X			Eldon's S.A., Athens, Greece
Elf Performance Discovery FE 15W-30		X					Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Polytrafic 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance TP 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Trophy DX 15W-40				X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Trophy FE 15W-30			X				Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Victory 15W-40				X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Victory FE 10W30	X						Total Lubrifiants, Paris la Defense Cedex, France
Elf Polytrafic 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France
Ellmotol Econo HDC		X					Eller-Montan-Comp. GmbH, Duisburg, Germany
Ellmotol Turbo HD 15W-40				X			Eller-Montan-Comp. GmbH, Duisburg, Germany
EMKA Ecomax DLE 10W40		X					EMKA Schmiertechnik GmbH, Heilbronn, Germany
EMKA Supergrade LL-X 10W40		X					EMKA Schmiertechnik GmbH, Heilbronn, Germany
EMKA Turbo Super SHPD				X			EMKA Schmiertechnik GmbH, Heilbronn, Germany

Emo SHPD Plus SAE 15W-40				X			Motor Oil (Hellas), Maroussi, Greece
Energomax Super SHPD				X			Energoinvest-Proizvodnja Maziva ddo, Sarajevo, Bosnia-Herzegovina
Engen Dieselube 500 Super				X			Engen Petroleum Ltd., Cape Town, South Africa
Engen Dieselube 600 Super				X			Engen Petroleum Ltd., Cape Town, South Africa
Engen Dieselube 700 Super				X			Engen Petroleum Ltd., Cape Town, South Africa
ENOC Vulcan 770X 15W-40				X			ENOC International Sales L.L.C., Dubai/United Arab Emirates
Ergo Diesel TIR				X			ERG Petroli SpA, Savona, Italy
Ertoil SHPD				X			Cepsa Lubricantes, S.A., Madrid, Spain
Ertoil Super HPD LD				X			Cepsa Lubricantes, S.A., Madrid, Spain
ESA Multilub SK				X			ESA, Burgdorf, Switzerland
Esso XD-3 Extra 15W-40				X			Imperial Oil, Sarnia, Ontario, Canada
Essolube XT 4 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XT 4 20W-50						X	Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XT 401				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XT 5 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XT 501				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XTS 4 10W-40		X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Eurol Bison		X					Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Eurol Biturbo		X					Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Eurol SHPD				X			Eurol Produktionsges.m.b.H,

							Ried im Innkreis, Austria
EUROLUB Multitec 10W/40		X					Hunold Schmierstoffe GmbH, Eching, Germany
Evva Galax FE		X					Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
Evva Multi SHPDO				X			Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
Exxmar CM Super 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Exxon XD-3 Elite				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Exxon XD-3 Extra				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Exxon XD-3 Extra 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Falcon Super XMD Oil				X			Falcon Oil Co. Ltd., Sharjah/United Arab Emirates
Fenix Superior				X			NIS Fabrika maziva, Krusevac/Serbia
Fina Kappa Extra Plus				X			Total Lubrifiants, Paris la Defense Cedex, France
Fina Kappa Extra Plus FE 15W-30			X				Total Lubrifiants, Paris la Defense Cedex, France
Fina Kappa FE		X					Total Lubrifiants, Paris la Defense Cedex, France
Fina Kappa Optima 15W-40				X			Total Lubrifiants, Paris la Defense Cedex, France
Forol SHPD-Max				X			Patting d.o.o., Varazdin, Croatia
Fuchs Titan Formel Plus				X			Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan HPE				X			Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Truck				X			Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan TRUCK PLUS SAE 15W-40				X			Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Unic MC		X					Fuchs Petrolub AG, Mannheim, Germany

Fuchs Titan Unic Plus MC		X					Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Unic Ultra MC		X					Fuchs Petrolub AG, Mannheim, Germany
Galax Super Long				X			Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galp Galaxia LD				X			Petrogal S.A., Lisbon, Portugal
Galp Galaxia LD Extra				X			Petrogal S.A., Lisbon, Portugal
Gedol Long Drain DMO				X			Gedol International S.r.l., Cerreto Guidi (FI), Italy
Gedol Long Endurance				X			Gedol International S.r.l., Cerreto Guidi (FI), Italy
Genius 6000				X			Mexoil slr, Nocera Inferiore (SA), Italy
Golden Seven Stars				X			Petrochina Dalian Lubricating Oil Plant, Dalian City, Liaoning Province, P. R. China
Gonher Super Fleet MB-III				X			Gonher de Mexico, S.A. de C.V., Santa Catarina, N.L., Mexico
Gonher Super Fleet MB-IIIa				X			Lubricantes de America, S.A. de C.V., Santa Catarina, N.L., Mexico
Greatwall Flying Leopard				X			Greatwall Lube Oil Co. Sinopec, Beijing, P. R. China
Green Star Multiturbo BD				X			F. lli. Galbarini S.r.l., Bresso, Italy
Guardian Commercial				X			Rock Oil Company, Warrington, Cheshire, England
Gulf Superfleet LE		X		X		X	Gulf Oil International, London, England
Gulf Superfleet Plus				X		X	Gulf Oil International, London, England
Gulf Superfleet Spezial QC, SAE 15W-40				X			Gulf Oil International, London, England
Gulf Superfleet Supreme		X					Gulf Oil International, London, England
Gulf Superfleet Supreme, SAE 10W-40				X			Gulf Oil International, London, England

Gulfleet LDS 15W-40				X			S.A. Espanola de Lubrificantes, Madrid, Spain
Hafa Multidex 600				X			Hafa, Paris, France
Hafa Stradex 1200				X			Hafa, Paris, France
Hafa Stradex 1500				X			Hafa, Paris, France
Hafa Stradex 900				X			Hafa, Paris, France
Haipai 2460				X			Shanghai Oil Refinery, Pudong, Shanghai, P. R. China
Hankook Shell Rimula Super				X			Hankook Shell Oil Company Limited, Seodaemoon-gu Seoul, Rep. Korea
Hankook Shell Rimula				X			CH-4 X Hankook Shell Oil Company Limited, Seodaemoon-gu Seoul, Rep. Korea
HEKRA SUPER GX - Truck, SAE 15W-40				X			HEKRA Opava, s.r.o., Opava 7, Czech Republic
Hercules HTF Special				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Hessol Turbo-Diesel				X			Hessische Oelwerke, Bad Vilbel, Germany
Hunold HD 4 CX Plus				X			Hunold Schmierstoffe GmbH, Eching, Germany
Hydroclear Power-D Engine Oil				X			Conoco Inc., Ponca City, OK, USA
ICPA Eco Diesel		X					ICPA, Dordrecht, Netherlands
ICPA Superior Diesel				X			ICPA, Dordrecht, Netherlands
IDO Premium 15W40				X			Irving Oil Limited, Saint John, New Brunswick, Canada
Iglo PROTRUCK 100X 10W-40		X					Iglo France, Amiens Cedex/France
Iglo PROTRUCK 100X, SAE 15W-40				X			Iglo France, Amiens Cedex/France
Igol Trans Turbo 5X, SAE 15W-40				X			Igol France, Amiens Cedex/France
Igol Trans Turbo 7X, SAE 15W-40				X			Igol France, Amiens Cedex/France

Igol Trans Turbo 9X, SAE 15W-40				X			Igol France, Amiens Cedex/France
ILS Extra Motor Oil				X			Industria Lubrificanti Speciali, Carsoli (AQ), Italy
INA Super Turbo				X			INA Maziva Rijeka, Rijeka, Croatia
Inter TRX3				X			Ets A. Mauran & Fils S.A., Odars, France
IP Tarus Turbo				X			Italiana Petroli (IP) S.p.A., Genoa/Italy
IP Tarus Turbo Extra				X			Italiana Petroli (IP) S.p.A., Genoa/Italy
ISA Supreme XL SAE 15W-40				X			Ingeniera Salas, S.A. de C.V., Mexico, D.F., Mexico
JB German Oil Turbo 3000D Truck				X			JB German Oil, Neuhof, Germany Speed
Jumbo Vertex Diesel Engine Oil				X			Pt. Jumbo Power International, Djakarta, Indonesia
Kendall Motor Oil SHPD LD 15W40				X			Handel-Mij Noviol B.V., Nijmegen, Netherlands
KIXX Turbo RV 15W/40				X			GS-Caltex Corporation, Seoul 135-985, Rep. Korea
Kluth Mehrbereichsmotorenol Super HDC				X			Oswald Kluth, Bargfeld-Stegen, Germany
Kompressol-Ultralub C plus				X			Kompressol-Oel Verkaufs GmbH, Cologne, Germany
KunLun CH-4/SJ				X			PetroChina Lubricant Company, Beijing, P.R. China
Kuwaitoil Super Diesel Oil SHPD				X			Kuwait National Petroleum Company, Kuwait, Kuwait
Liqui Moly LKW-Leichtlauf Motoroil		X					Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Leichtlauf Motorol		X					Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech SHPD				X			Liqui Moly GmbH, Ulm, Germany

LONG WAY, SAE 15W-40				X			Minerva Oil, Meuzac/France
Long-Life EF Diesel Engine Oil				X			Pennzoil-Quaker State Company, Houston, Texas, Multigrade USA
Lubex Premium 15W40				X			Belgin Madeni Yaglar Tic. Ve San. A.S., Gebeze Kocaeli, Turkey
Lubral Diesel MB-III				X			Lubricantes de America, S.A. de C.V., Santa Catarina, N.L., Mexico
Lubral Super Diesel MB-III				X			Lubricantes de America, S.A. de C.V., Santa Catarina, N.L., Mexico
Lubro Supertrans Diesel				X			Lubritalia S.p.A., Palagiano (Taranto), Italy
Lubroviscol Superior LL		X					Shell International Petroleum Co., London, England
Lubstar Turbo diesel						X	S.C. Lubrifin S.A., Brasov, Rumania
Lukoil-Avangard				X			OAO LUKOIL, Moscow, Russia
Lunar Max Super Diesel Motor Oil				X			Comet Oil Philippines, Inc., San Juan, Metro Manila, Philippines
Madit Tirman				X			Slovnaft a.s., Bratislava 23/Slovak Republic
MADIT TRANSIT TDS		X					Slovnaft a.s., Bratislava 23/Slovak Republic
MANNOL Truck Special SHPD				X			SCT-Vertriebs GmbH, Wedel, Germany
Mapetrol Motorol SHPD				X			Mapetrol d.o.o., Maribor, Slovenia
Maschinenring-Premium 10W-40 (SHPD)		X					MR Central GmbH, Hofheim-Wallau, Germany
Maschinenring-Premium TD 15W-40 (SHPD)				X			MR Central GmbH, Hofheim-Wallau, Germany
master class Alpha 1040.3		X					V.W. Gunther Mineralolhandelsges.mbH, Bebra, Germany
master class Taurus 1540				X			V.W. Gunther Mineralolhandelsges.mbH,

							Bebra, Germany
Maxima Turbo				X			Oil Refinery Modrica, Modrica, Bosnia-Herzegovina
Meditran SX				X			PT PERTAMINA (PERSRO), Jakarta/Indonesia
Medos 600				X			Unil S.A., Saumur, France
Medos 650				X			Unil S.A., Saumur, France
Mega Truck 15W-40				X			Kuttenkeuler GmbH, Cologne, Germany
Megaturbo				X			Rilub S.p.A., Ottaviano (NA), Italy
megol Motorenoel Performance TOP TRANS				X			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
megol Motorenoel SHPD				X			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
megol Motorenoel Super Leichtlauf FAMO		X					Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
Midland Super Diesel		X		X			Oel-Brack AG, Hunzenschwil, Switzerland
Migrol Motor Oil Multi SK		X					Migrol-Genossenschaft, Zurich, Switzerland
Migrol Superlife Special Plus				X			Migrol-Genossenschaft, Zurich, Switzerland
Mobil Delvac 1300 Super 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac 1400 Super 15W-40		X					Exxon Mobil Lubricants & Petroleum Specialties, Fairfax, Virginia 22037-0001, USA
Mobil Delvac CX				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac MX				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac MX 101 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac MX 111 15W-40				X			Exxon Mobil Lubricants & Petroleum Specialties, Fairfax, Virginia 22037-

							0001, USA
Mobil Delvac MX 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac MX Extra 10W-40		X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac Super 1300 20W-50						X	Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac Super 1400 15W-40				X			ExxonMobil Corporation, Paulsboro/USA
Mobil Delvac XHP		X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Delvac XHP 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobilgard HSD 4015W				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mogul Diesel DTT				X			Paramo, a.s., Pardubice, Czech Republic
Mogul Optimal		X					Paramo, a.s., Pardubice, Czech Republic
Mogul Optimal FE		X					Paramo, a.s., Pardubice, Czech Republic
Moil Dizel 15W40				X			Bolunmez Petrolculuk A.S., Sodak No:6 Cigli - IZMIR, Turkey
MOL MK-9				X			MOL -LUB Ltd., Almasfuzito/Hungary
MOL Super Diesel 15W-40				X			MOL -LUB Ltd., Almasfuzito/Hungary
MOL Transit TD				X			MOL -LUB Ltd., Almasfuzito/Hungary
MOL Transit TDS		X					MOL -LUB Ltd., Almasfuzito/Hungary
Molykote SHPD				X			Krafft S.A., Andoain (Guipuzcoa), Spain
Mopar MAX PRO 15W-40				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Morris ring free Euro 3 Plus				X			Morris & Co. Ltd., Shrewsbury, England
Morris ring free XHD				X			Morris & Co. Ltd., Shrewsbury, England
Morris ring free XHD plus				X			Morris & Co. Ltd., Shrewsbury, England
Motor Gold Turbotec SAE 15W-40				X			Mineralol-Raffinerie Dollbergen GmbH, Uetze-

							Dollbergen, Germany
Motorenol 10W/40		X					Bundesamt fur Betriebe des Heeres, Bern, Switzerland
Motorex Farmer MC		X					Bucher AG Langenthal, Langenthal/Switzerland
Motorex MC Plus		X					Bucher AG Langenthal, Langenthal/Switzerland
Motorex Motor Oil Farmer Uni		X					Bucher AG Langenthal, Langenthal/Switzerland
Motorex Turbo SK				X			Bucher AG Langenthal, Langenthal/Switzerland
Motorex Universal		X		X			Bucher AG Langenthal, Langenthal/Switzerland
Motorol Super Long				X			Chemol, Belgrade/Serbia
Motul Tekma Mega 15W-40				X			Motul, Aubervilliers/France
Motul Tekma Mega				X			15W-40 X Motul, Aubervilliers/France
Multigrado 15W40 SHPD				X			Krafft S.A., Andoain (Guipuzcoa), Spain
Multitruck				X			Wynns Italia S.p.a., Santa Croce Sull' Arno (PI)/Italy
Nervol TS4E				X			Nervol S.A., Montpouillan, France
New Process SHPD Super				X			New-Process AG, Tubach SG, Switzerland
New Process Super Dallas		X					New-Process AG, Tubach SG, Switzerland
New-Process Super Dallas THC				X			New-Process AG, Tubach SG, Switzerland
Nils Mistral				X			Nils Italia GmbH, Burgstall, Italy
Noaloil Diam LD turbo diesel				X			Noaloil, Noale (VE), Italy
Oest Dimo Super S 3				X			Georg Oest Mineralolwerk GmbH & Co KG, Freudenstadt/Germany
Oest Gigant Turbo FE		X					Georg Oest Mineralolwerk GmbH & Co KG, Freudenstadt/Germany
Oest Low-Friction Oil FE 10W-40		X					Georg Oest Mineralolwerk GmbH & Co KG, Freudenstadt/Germany

Olmaline SHPD				X			OLMA d.d., Ljubljana, Slovenia
OMV eco truck		X					OMV Refining & Marketing GmbH, Vienna, Austria
OMV eco truck extra SAE 10W-40		X					OMV Refining & Marketing GmbH, Vienna, Austria
OMV truck LD				X			OMV Refining & Marketing GmbH, Vienna, Austria
ORLEN OIL Diesel (3) SHPDO CG-4 15W/40				X			Orlen Oil Sp. z o.o. Krakow, Poland
Orly Turbo 3002				X			Orly International, Vieux-Thann, France
Orol Gold HD Super Multigrad				X			Amstutz Produkte AG, Eschenbach Lucerne/Switzerland
Orol Gold Maximot		X					Amstutz Produkte AG, Eschenbach Lucerne/Switzerland
Orol Gold Truckmot SKSHPD				X			Amstutz Produkte AG, Eschenbach Lucerne/Switzerland
Orol Gold Turbomot				X			Amstutz Produkte AG, Eschenbach Lucerne/Switzerland
OTP Plus Universal-Leichtlauf- Motorenol		X					Muller Mineralole Handels-und Beratungsgesellschaft mbH. Eschweiler, Germany
OTP Plus Universal-Motorenol				X			Muller Mineralole Handels-und Beratungsgesellschaft mbH. Eschweiler, Germany
P.O. Turbo Dizel Ekstra E				X			Petrol Ofisi Anonim Sirketi, Istanbul, Turkey
Pakelo PKO Kentron				X			Pakelo Motor Oil S.r.l., San Bonifacio (Vr), Italy
Panolin Diesel Synth		X					Panolin AG, Madetswil, Switzerland
Panolin Universal				X			Panolin AG, Madetswil, Switzerland

Panolin Universal FE 10W/40		X					Panolin AG, Madetswil, Switzerland
Panolin Universal SFE		X					Panolin AG, Madetswil, Switzerland
Parnas Hercules 4 SAE 15W-40					X		Sakson S.A, Athens, Greece
Pars Paydar				X	X	X	Pars Oil Co., Teheran/Iran
PENNASOL Lightrun 2000 SAE 10W-40				X			Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Pennzoil Fleetmaster				X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Pennzoil Long-Life Plus				X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Pentotruck ECO Light		X					Deutsche Pentosin-Werke GmbH, Wedel, Germany
Pentotruck Extra				X			Deutsche Pentosin-Werke GmbH, Wedel, Germany
Performance Top Trans SHPD				X			Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
Petromin Fleetmaster LD				X			Petromin Oils., Jeddah/Saudi Arabia
Petromin Superfleet LD 15W40				X			Petromin Oils., Jeddah/Saudi Arabia
Petronas Motolub CS3 CH-4				X			Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Petronas Motolub CS3 CI-4				X			Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Platinum Ultor CH-4 15W/40				X			Orlen Oil Sp. zo.o., Cracow/Poland
Platinum ultor Plus 15W/40				X			Orlen Oil Sp. zo.o., Cracow/Poland
PO Turbo Dizel Extra				X			Petrol Ofisi Anonim Sirketi, Istanbul, Turkey
Power MB 15W-40				X			Emirates general Petroleum Corporation, Dubai. United Arab Emirates/United Arab Emirates

Prista SHPD				X		X	Prista Oil Ltd., Rousse, Bulgaria
Prista Turbo Diesel, SAE 15W-40				X			Prista Oil Ltd., Rousse, Bulgaria
PROFI-CAR DIESEL POWER TRUCK LIGHTRUN				X			Profi-Tech GmbH, Gingen, Germany
Profi-Car Diesel Power Truck Turbo				X			Profi-Tech GmbH, Gingen, Germany
Proton turbo diesel				X			Petrol d.d., Ljubljana, Slovenia
Q8 T 710				X			Kuwait Petroleum, Hoogvliet RT, Netherlands
Q8 T 720				X			Kuwait Petroleum, Hoogvliet RT, Netherlands
Q8 T 730				X			Kuwait Petroleum, Hoogvliet RT, Netherlands
Q8 T 750				X			Kuwait Petroleum, Hoogvliet RT, Netherlands
Q8 T 800		X					Kuwait Petroleum, Hoogvliet RT, Netherlands
QS Superfleet				X			Commercial Importadora S.A., Mexico, D.F., Mexico
Quaker State HDX Plus				X			Pennzoil-Quaker State, Houston, Texas 77002, USA
Quaker State Super Diesel		X					X Oel-Brack AG, Hunzenschwil, Switzerland
Quaker State Super Series III				X			Commercial Importadora S.A., Mexico, D.F., Mexico
Qualube Endurol 15W/40				X			Witham Oil & Paint Ltd., Lincoln, England
Qualube SHPD				X			Witham Oil & Paint Ltd., Lincoln, England
Quan Fang W ei				X			Beijing Tongyi Petroleum Chemical Co., Ltd., Beijing, P.R. China

Raloy Diesel Supreme VDS-3				X			Raloy Lubrcantes, Santiago Tianguistenco, Mexico
Ravenol Expert SHPD SAE 10W-40		X					Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Ravenol Mineraloel Turbo - Plus				X			Ravensberger Schmierstoffvertrieb GmbH, Werther, SHPD Germany
Repsol Diesel Turbo THPD				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Repsol Extra Vida				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Repsol Extra Vida Plus				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Repsol Super Turbo Diesel				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Roshfrans Voltro Diesel				X			Comercial Roshfrans, S.A. de C.V., Mexico, D.F., Mexico
ROWE Formula GT 1040 HC		X					ROWE Mineralolwerk GmbH, Bubenheim, Germany
RS200 motor oil				X			Papandoniou S.A, Hellas/Greece
RTO Maxima RD ECO 15W-30			X				Huiles Berliet S.A., Paris, France
RTO Maxima RLD 15W-40				X			Huiles Berliet S.A., Paris, France
RTO Maxima RLD ECO 15W-30			X				Huiles Berliet S.A., Paris, France
RTO Maxima TC ECO 10W-30	X						Huiles Berliet S.A., Paris, France
RTO Maxteria 10W-40		X					Huiles Berliet S.A., Paris, France
RTO Maxteria Polytrafic 10W-40		X					Huiles Berliet S.A., Paris, France
Sarol SHPD Lorry				X			Sarol Lubricants Ltd, Schimatari, Greece
Sasol Sapphire 15W40				X			Sasol Oil (Pty) Ltd,

							Randburg, South Africa
Saturnia Super 15W40				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Sharlu Turbo Diesel Engine Oil				X			Sharjah National Lube Oil, Sharjah/United Arab Emirates
Shell Engine Oil DG		X					Shell International Petroleum Co., London, England
Shell Normina Plus				X			Shell International Petroleum Co., London, England
Shell Rimula MV				X			Shell International Petroleum Co., London, England
Shell Rimula Premium				X			Shell International Petroleum Co., London, England
Shell Rimula Super				X			Shell International Petroleum Co., London, England
Shell Rimula Super CI-4				X			Shell International Petroleum Co., London, England
Shell Rimula Super FE		X					Shell International Petroleum Co., London, England
Shell Rimula X				X			Shell International Petroleum Co., London, England
Shell Rimula X CH-4				X		X	Shell International Petroleum Co., London, England
Shell Rotella T				X			Shell International Petroleum Co., London, England
Shell Rotella T Multigrade				X			Shell International Petroleum Co., London, England
Sips-Record Turbo T				X			Sips-Dieter Docker GmbH, Viersen, Germany
Sips-TLM-1 Plus		X					Sips-Dieter Docker GmbH, Viersen, Germany
Sips-TSL 3 Extra				X			Sips-Dieter Docker

							GmbH, Viersen, Germany
SPC SDM 900				X			Singapore Petroleum Co. Ltd., Singapore
Speedol SHPD Tirot 15W40				X			Kocak Petrol urunleri San. Ve Tic. Ltd. Sti., Gebeze-Kocaeli/Turkey
Statoil EuroWay				X			Statoil Lubricants Technologies Sp. Z o.o., Krakow, Poland
Statoil MaxWay 10W-30	X						Svenska Statoil AB, Stockholm, Sweden
Statoil MaxWay 10W-40		X					Svenska Statoil AB, Stockholm, Sweden
Statoil MaxWay 15W-40				X			Svenska Statoil AB, Stockholm, Sweden
Statoil TurboMaxWay				X			Statoil Lubricants Technologies Sp. Z o.o., Krakow, Poland
Strub Lato MB				X			Strub + Co AG, Reiden, Switzerland
Strub Super Multi Turbo				X			Strub + Co AG, Reiden, Switzerland
Sunoco Super HPD				X			Sun Oil Co. (Belgium) N.V., Aartselaar, Belgium
Super Diesel Oil MB-3				X			Bardahl de Mexico, Mexico, D.F., Mexico
Superdiesel Turbo				X			Conqord Oil S.r.l., Lacchiarella (MI), Italy
SVG Esvaugol FE		X					Handelsges. fur Kfz-Bedarf GmbH & CO. KG, Dusseldorf, Germany
SVG Uniplus Turbo SHPD				X			Handelsges. fur Kfz-Bedarf GmbH & CO. KG, Dusseldorf, Germany
swd Expert LDF		X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
swd FAVORIT LMF SAE 10W40		X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
swd FAVORIT MF SAE 15W40				X			Swd Lubricants GmbH & Co. KG, Duisburg, Germany
Tamoil Super Diesel				X			Tamoil Petroli S.p.A.,

Turbo							Milan, Italy
Taurus SHPD E3				X			Greenway Lubricants Limited, Wednesbury, West Mid, England
Teboil Super HPD				X			Oy Teboil AB, Suomen Petrooli Oy, Hamina/Finland
Technik Ecomot Plus 10W-40		X					Raiffeisen Central-Genossenschaft Nordwest eG, Munster, Germany
Tedex Diesel Truck FE (SHPD) Motor Oil				X			Tedex Vertriebs GmbH, Berlin, Germany
Texaco Ursa Energy	X						ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Texaco Ursa Premium TDX, SAE 15W-40				X			ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Texaco Ursa Super Plus				X			ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Texaco Ursa Super TD		X					X X ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Texaco Ursa TDX		X					ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Texaco Ursa Turbo				X		X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Top Lube Extra Super DEO				X			ABS Lubricants, Abu Dhabi/United Arab Emirates
Tor Synfleet SHPD		X					De Oliebron B.V., Zwijndrecht, Netherlands
Tor Unifleet Ultra				X			De Oliebron B.V., Zwijndrecht, Netherlands
Tor Unifleet Ultra HS 10W40		X					De Oliebron B.V., Zwijndrecht, Netherlands
Total Multi TP Max 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France

Total Rubia 4400 TSA				X			Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia FE		X					Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia Polytrafic 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR 6400 15W-40				X			Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR 6400 FE 15W-30		X					Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR 7200 FE 15W30		X					Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR 7400 15W-40				X			Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR 7400 FE 10W30	X						Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR Max				X			Total Lubrifiants, Paris la Defense Cedex, France
Total Rubia TIR XLD				X			Total Lubrifiants, Paris la Defense Cedex, France
Total TP MAX 10W-40		X					Total Lubrifiants, Paris la Defense Cedex, France
Touring High Tech Super Tropic					X		Liqui Moly GmbH, Ulm, Germany
Triathlon Diesel Longlife				X			Adolf Wurth GmbH & Co. KG, Kunzelsau, Germany
Triathlon Dynamik		X					Adolf Wurth GmbH & Co. KG, Kunzelsau, Germany
Truckmaster DX				X			Millers Oils Ltd., Brighouse West Yorkshire, England
Truckmaster E5				X			Millers Oils Ltd., Brighouse West Yorkshire, England
Truckmaster Global CX				X			Millers Oils Ltd., Brighouse West Yorkshire, England
Truckmaster Global XD				X			Millers Oils Ltd., Brighouse West Yorkshire, England
Truckmaster LD		X					Millers Oils Ltd., Brighouse West Yorkshire, England
Truckmaster XHPD				X			Millers Oils Ltd.,

							Brighouse West Yorkshire, England
Trysk Top Tir				X			Paramo a.s., Pardubice/Czech Republic
Turbo Leichtlauf 10W-40		X					Raiffeisen Central-Genossenschaft Nordwest eG, Munster, Germany
Turbopaz				X			Paz Lubricants & Chemicals Ltd., Haifa, Israel
TurboplusLD 10W-40		X					Verkol, S.A., Bera/Navarra, Spain
Turdus 3 SHPD				X			Grupa Lotos SA., Gdansk, Poland
Turdus Powertec CI-4 15W/40				X			Grupa Lotos SA., Gdansk, Poland
Unil Manto TD				X			Unil Germany GmbH, Stuttgart, Germany
Unimot 3				X			GB Lubricants, Gateshead/England
Urania LD5				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Urania Turbo LD				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Uranus Turbo				X			C.F.C.L., Merignac/France
Ursa Premium TDX	X			X			Productos Texaco S. A. de C. V., Mexico, D.F., Mexico
Ursa Super TD				X		X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Ursa Super TLF 10W-40		X					Texaco Germany GmbH, Hamburg, Germany
Ursa Turbo				X		X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Valar Adut Uni		X					NOCC, a.s., Praha 8, Czech Republic
Valar Egida 154				X			NOCC, a.s., Praha 8, Czech Republic

Valmax Ultra				X			Morris & Co. Ltd., Shrewsbury, England
Valvoline All Fleet Extra		X		X		X	The Valvoline Company, Lexington, KY/USA
Valvoline All-Fleet Extreme	X						The Valvoline Company, Lexington, KY/USA
Valvoline Premium Blue E				X			The Valvoline Company, Lexington, KY/USA
Vanguard Super Performance				X			Compagnia Italiana Lubrificanti. SpA, Milan, Italy
Vanguard Super Performance 15W-40				X			Compagnia Italiana Lubrificanti. SpA, Milan, Italy
Veco Challenger SHPD				X			Przedsiebiorstwo Modex-Oil, Kwidzyn, Poland
Vector SHPD				X			S.C. Lubrifin S.A., Brasov, Rumania
Veritas Super HDC-N				X			Oelwerke Julius Schindler GmbH, Hamburg, Germany
Verkol Turboplus LD				X			Verkol, S.A., Bera/Navarra, Spain
Verkoplus-SHPD				X			Verkol, S.A., Bera/Navarra, Spain
Wintershall Multi-Rekord top				X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall TFX				X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall Turbo-Rekord		X					SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wisura Multi TS				X			Wisura Mineralolwerk, Bremen, Germany
Wisura Premium MC				X			Wisura Mineralolwerk, Bremen, Germany
Wolf Masterlube Ecomiles		X					Wolf Oil Corporation N.V., Hemiksem, Belgium
Wolf Masterlube LDT SHPD 15W40				X			Wolf Oil Corporation N.V., Hemiksem, Belgium
Wunsch TLM				X			Wunsch ole GmbH, Ratingen, Germany

Wunsch Turbo Record		X					Wunsch ole GmbH, Ratingen, Germany
XD-3 Extra				X			Imperial Oil, Sarnia, Ontario, Canada
Xorbol Leichtlaufol HDC				X			Hilbert GmbH, Emsdetten, Germany
Xorbol Super Mehrbereichsol HDC		X					Hilbert GmbH, Emsdetten, Germany
Yacco Transpro 35				X			Yacco SAS, Saint-Pierre-les-Elbuf/France
Yacco Transpro 40 15W40				X			Yacco SAS, Saint-Pierre-les-Elbuf/France
YACCO TRANSPRO 40 S SAE				X			Yacco SAS, Saint-Pierre-les-Elbuf/France
10W-40 YC-1000		X					Guangxi Yuchai Superior Lube oil Co., Ltd., Yuliin, Guangxi, P. R. China
York 645				X			Ginouves Georges S.A., La Farlede, France
York 745				X			Ginouves Georges S.A., La Farlede, France
York 846				X			Ginouves Georges S.A., La Farlede, France
York 847 10W40		X					Ginouves Georges S.A., La Farlede, France
York 849 10W40		X					Ginouves Georges S.A., La Farlede, France
York 849 SAE 15W40				X			Ginouves Georges S.A., La Farlede, France
YPF Extra Vida				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
YPF Extra Vida Plus				X			Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Zeppelin Dieselmotorenol DEO 1040		X					Zeppelin Baumaschinen GmbH, Garching near Munich, Germany
Zeppelin Dieselmotorenol DEO 1540				X			Zeppelin Baumaschinen GmbH, Garching near Munich, Germany
ZIC 5000 Power		X					SK Corporation, Seoul KR/Rep. Korea
ZIC XQ 5000 15W/40				X			SK Corporation, Seoul

							KR/Rep. Korea

MULTIGRADE ENGINE OILS (SHEET 229.1) - BB00.40-P-0229-01A

i For use in vehicles/engines refer to ? Sheet 223.2

Product name	0W-30	0W-40	10W-30	10W-40	10W-50	10W-60	15W-40	15W-50	5W-20	5W-30	5W-40	Customer, town/country
76 Guardol QLT							X					ConocoPhillips, Costa Mesa, CA, USA
AD MDX Plus					X							AD Parts, S.L., Riudellots de la Selva (Girona), Spain
AD Parts LDX									X			AD Parts, S.L., Riudellots de la Selva (Girona), Spain
AD Parts MDX									X			AD Parts, S.L., Riudellots de la Selva (Girona), Spain
ad-Diesel-Oil				X								Carat GmbH & Co. KG, Eschborn, Germany
Addinol Diesel Longlife MD 1548							X					Addinol Lube Oil GmbH, Leuna, Germany
Addinol light MV 0546 PD												X Addinol Lube Oil GmbH, Leuna, Germany
Addinol Premium Star MX 1048				X								Addinol Lube Oil GmbH, Leuna, Germany
Addinol Semi synth MV 1047				X								Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super drive MV 1546							X					Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super Longlife MD 1047					X							Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super star MX 1547							X					Addinol Lube Oil GmbH, Leuna, Germany
ad-Leichtlauf-Oil				X								Carat GmbH & Co. KG, Eschborn,

												Germany
Adnoc Global Ultra Engine Oil SAE 10W-40				X								Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc HPSD Engine Oil							X					Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc Pearl 10W-40				X								Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc Special 20W-50									X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
Adnoc Special SJ Formula									X			Adnoc Distribution, Abu Dhabi/United Arab Emirates
ad-Ultrasynt-Oil		X										Carat GmbH & Co. KG, Eschborn, Germany
Agip Eurosport 5W-30										X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip F1 Supermotoroil							X	X	X			ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Formula LL Plus				X								ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sigma Super TFE				X								ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sigma TFE				X								ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip SINT 2000				X								ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip SINT COMMON RAIL												X ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip SINT Turbo Diesel				X								ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Synthetic PC Motor Oil										X		ENI S.p.A. - Refining & Marketing Division,

5W-30												Rome, Italy
Agip Tecsint										X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Universal Multifleet							X					ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Alma Power Semi-Syntech											X	Meguin GmbH & CO. KG Mineraloelwerke, Saarlouis, Germany
Alma Syntech				X								Meguin GmbH & CO. KG Mineraloelwerke, Saarlouis, Germany
Alpine				X								Mitan Mineralol GmbH, Ankum, Germany
Alpine RSL											X	Mitan Mineralol GmbH, Ankum, Germany
Alpine RSL 0W-40 full synth.			X									Mitan Mineralol GmbH, Ankum, Germany
Alpine RST Super plus 15 W 40							X					Mitan Mineralol GmbH, Ankum, Germany
Amalie/APSA Elixir Synthetic 10W-40				X								Amalie Petroquimica S.A., Madrid, Spain
Amalie/APSA Elixir Synthetic 5W-30										X		Amalie Petroquimica S.A., Madrid, Spain
Amalie/APSA Imperial 20W-50										X		Amalie Petroquimica S.A., Madrid, Spain
Antar Isofluide Diesel							X					Total Lubrifiants, Paris la Defense Cedex, France
Antar Isofluide Plus							X					Total Lubrifiants, Paris la Defense Cedex, France
Antar Synthia				X								Total Lubrifiants, Paris la Defense Cedex, France
Antar Synthia Turbo Diesel				X								Total Lubrifiants, Paris la Defense Cedex,

												France
Aral BlueTronic				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral ExtraElastic				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral ExtraTurboral				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral HighEnergy 10W-40				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral HighTronic												XAral Aktiengesellschaft, Hamburg, Germany
Aral MultiTurboral							X					Aral Aktiengesellschaft, Hamburg, Germany
Aral PlusSynth				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral Super Elastic Plus				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral Super Elastic				X								Aral Aktiengesellschaft, Hamburg, Germany
Aral Tronic							X					Aral Aktiengesellschaft, Hamburg, Germany
Argon Leichtlaufol				X								Voitlander GmbH & Co. KG, Kronach, Germany
Argon low-friction oil 10W-40 SHPD				X								Voitlander GmbH & Co. KG, Kronach, Germany
Argus GX Super							X					Hemco, Belgrade/Serbia
Ashland A.P.B. SynTech DDH				X								Ashland Nederland B.V., AA, Dordrecht/Netherlands
Ashland A.P.B. Turbo Guard MDX							X					Ashland Nederland B.V., AA, Dordrecht/Netherlands

Astris Motor Oil LDX							X					Astris S.A., Giornico, Switzerland
Astris Motor Oil LDX Plus				X								Astris S.A., Giornico, Switzerland
Astris Motor Oil MF							X					Astris S.A., Giornico, Switzerland
Astris Motor Oil Synth											X	Astris S.A., Giornico, Switzerland
Astris Motor Oil Universal				X								Astris S.A., Giornico, Switzerland
Autol Grand Prix LL Plus				X								Agip Schmiertechnik GmbH, Wurzburg, Germany
Autol Valve Turbo FE				X								Agip Schmiertechnik GmbH, Wurzburg, Germany
Autol Valve Ultra FE				X								Agip Schmiertechnik GmbH, Wurzburg, Germany
Avia Multi CFE Plus				X								Avia Mineralol-AG, Munich, Germany
Avia Multi HDC Extra							X					Avia Mineralol-AG, Munich, Germany
Avia Turbo CFE				X								Avia Mineralol-AG, Munich, Germany
Avia Turbosynth CFE				X								Avia Mineralol-AG, Munich, Germany
Aviaticon Turbo D 10W-40				X								Finke Mineralolwerk GmbH, Visselhovede/Germany
Aviaticon Unique LL				X								Finke Mineralolwerk GmbH, Visselhovede/Germany
BayWa Motorenol HDC 1540							X					BayWa AG, Munich, Germany
BayWa Motorenol Rennklasse 3000 plus				X								BayWa AG, Munich, Germany
BayWa Motorenol Rennklasse Turbo 2000				X								BayWa AG, Munich, Germany
BayWa				X								BayWa AG, Munich,

Motorenol Turbo 4000												Germany
BayWa Motorenol Universal HD 1040 MC				X								BayWa AG, Munich, Germany
BayWa Universal HD 1040 MC				X								BayWa AG, Munich, Germany
Behran Motor Oil BMB				X					X			Behran Oil Company, Tehran - Iran
Behran Super Pishtaz				X			X		X			Behran Oil Company, Tehran - Iran
Bell Elite Synth				X								Bell chemicals, Banatsko Veliko Selo/Serbia
Blasol 15W-40							X					Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
Blasol FEO 10W40				X								Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
Blasol MHP 15W40							X					Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
BP Autovista Leichtlaufol HD				X								BP p.I.c., London, England
BP Energol LLO											X	BP p.I.c., London, England
BP Euro Spirit											X	BP p.I.c., London, England
BP Motorenoel SL				X								BP p.I.c., London, England
BP Visco 2000 15W-40							X					Lubricants UK Ltd, Technology Centre, Reading/England
BP Visco 2000 15W-50								X				BP p.I.c., London, England
BP Visco 2000 Diesel								X				BP p.I.c., London, England
BP Visco 2000 M								X				BP p.I.c., London, England
BP Visco 3000 10W-40					X							Lubricants UK Ltd, Technology Centre, Reading/England

BP Visco 3000 15W-50								X				BP p.I.c., London, England
BP Visco 3000 Diesel				X								BP p.I.c., London, England
BP Visco 3000 Turbo Diesel				X								Lubricants UK Ltd, Technology Centre, Reading/England
BP Visco 5000 10W-40					X							BP p.I.c., London, England
BP Visco 7000		X										BP p.I.c., London, England
BP Visco 7000 Turbo Diesel		X										BP p.I.c., London, England
BP Visco Diesel		X										BP p.I.c., London, England
BP Visco Diesel 15W-40							X					Lubricants UK Ltd, Technology Centre, Reading/England
BP Visco Special V											X	BP p.I.c., London, England
Burgan Extra										X		Kuwait Petroleum, Hoogvliet RT, Netherlands
Calpam Modul FE				X								Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Calpam Rallye Synth											X	Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Calpam Truck FE				X								Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Caltex Havoline Formula Advanced										X		Caltex International Technical Center Pty Ltd, Australia
Caltex Havoline Fully Synthetic					X			X		X	X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Caltex Havoline Semi-Synthetic				X			X	X				ChevronTexaco Technology Ghent, Ghent/Zwijnaarde,

												Belgium
CAR JACK 10W-40 GSX6				X								MGB METRO Buying GmbH, Dusseldorf/Germany
CAR JACK 15W-40 GSX							X					SIG Import GmbH, Dusseldorf/Germany
CAR JACK 5W-40 GPD											X	SIG Import GmbH, Dusseldorf/Germany
Carl Leichtlauf-Motorenol Diesel				X								Coparts Autoteile GmbH, Essen, Germany
Carl Leichtlauf-Motorenol Economy				X								Coparts Autoteile GmbH, Essen, Germany
Carl Synthetic-Motorenol Power											X	Coparts Autoteile GmbH, Essen, Germany
Carl Synthetic-Motorenol Ultra		X										Coparts Autoteile GmbH, Essen, Germany
Castle Euaro				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Castrol CRF Diesel							X					Castrol Limited, GB Reading RG8 7QR, England
Castrol CVX Plus				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol CXD Diesel							X					Castrol Limited, GB Reading RG8 7QR, England
Castrol GTD 10W-40				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Magnatec 10W-40				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTD Plus				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 10W-40				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX								X				Lubricants UK Ltd,

15W-50												Technology Centre, Reading/England
Castrol GTX 2 15W-40							X					Lubricants UK Ltd, Technology Centre, Reading/England
Castrol GTX 3				X			X	X	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 3 15W-40							X					Lubricants UK Ltd, Technology Centre, Reading/England
Castrol GTX 3 Professional						X						Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 3 Protection						X						Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 5 Lightec				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 5 Magnatec				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX High Mileage						X						Lubricants UK Ltd, Technology Centre, Reading/England
Castrol GTX Magnatec 10W-40				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Magnatec 15W-40						X						Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Performance			X									Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Performance Plus				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Powertec				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX Powertec 7 Way				X								Lubricants UK Ltd, Technology Centre, Reading/England
Castrol GTX			X	X			X	X	X			Castrol Limited, GB

Protection Plus												Reading RG8 7QR, England
Castrol GTX2								X				Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX3 Basic						X						Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX3 Lightec				X								Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX3 Protec							X					Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX3 Protection Plus							X	X				Castrol Limited, GB Reading RG8 7QR, England
Castrol GXL 10W-40				X								Castrol Limited, Reading RG8 7QR, England
Castrol Magnatec 10W-40 A3/B3				X								Castrol Limited, Reading RG8 7QR, England
Castrol Magnatec 15W-40 A3/B3							X					Castrol Limited, Reading RG8 7QR, England
Castrol Magnatec Professional A3				X								Castrol Limited, Reading RG8 7QR, 10W-40 England
Castrol Performance 10W-30			X									Castrol Limited, Reading RG8 7QR, England
Castrol Performance 10W-40				X								Lubricants UK Ltd, Technology Centre, Reading/England
Castrol Protection 15W-40							X					Lubricants UK Ltd, Technology Centre, Reading/England
Castrol Protection 20W-50									X			Castrol Limited, Reading RG8 7QR, England
Castrol Tection 1040				X								Castrol Limited, Reading RG8 7QR, England
Castrol TXT			X									Castrol Limited,

10W-30												Reading RG8 7QR, England
Castrol TXT 10W-40				X								Lubricants UK Ltd, Technology Centre, Reading/England
Cepsa Star										X		Cepsa Lubricantes, S.A., Madrid, Spain
Cepsa Star Synthetic				X								Cepsa Lubricantes, S.A., Madrid, Spain
Cepsa Star TDI-GTI								X				Cepsa Lubricantes, S.A., Madrid, Spain
Chevron Supreme 100% Synthetic Motor Oil							X					ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
CLAAS Engine							X					CLAAS Vertriebsgesellschaft mbH, Harsewinkel, Germany
CLAAS Engine Top								X				CLAAS Vertriebsgesellschaft mbH, Harsewinkel, Germany
Classic Highline								X				Christian Luhmann GmbH & Co. KG, Hoya, Germany
Classic Speedline											X	Christian Luhmann GmbH & Co. KG, Hoya, Germany
Classic Turboline					X							Christian Luhmann GmbH & Co. KG, Hoya, Germany
CONCEP-TECH DIESEL SAE				X								Swd Lubricants GmbH & Co. KG, Duisburg, 10W40 Germany
CONCEP-Tech GDX							X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
CONCEP-TECH GT							X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
CONCEP-TECH Synth.											X	Swd Lubricants GmbH & Co. KG, Duisburg, Germany
CONCEP-				X								Swd Lubricants GmbH

TECH TS												& Co. KG, Duisburg, Germany
Condat Vicam Excel 10W-40				X								Condat S.A., Chasse-sur-Rhone, France
Consol Ultra		X									X	Vial Oil Ltd., Moscow, Russia
Coslube 1											X	Cosmic Oil (S) pte. Ltd., Singapore, Singapore
Cyclon F Super							X					Cyclon Hellas S.A., Maroussi, Greece
Cyclon F1				X								Cyclon Hellas S.A., Maroussi, Greece
Denicol Syntexgrade				X								Denicol Motor Oils NV, Ranst, Belgium
Divinol Multimax Extra				X								Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol Multimax HD C3							X					Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol Syntholight 0W-40		X										Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol Syntholight 5W-40											X	Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol turbo							X					Zeller + Gmelin GmbH & Co., Eislingen, Germany
Dragon Combo Best			X	X								S-Oil Corporation, Seoul, Rep. of Korea
Driver Sport				X								Kuttenkeuler GmbH, Cologne, Germany
Duckhams Q 10W-40 Synthetic based (Dielsel)				X								BP p.I.c., London, England
Duckhams Q 10W-40 Synthetic based (Petrol)				X								BP p.I.c., London, England
Duckhams Q 15W-40 Mineral (Diesel)							X					BP p.I.c., London, England

Duckhams Q 15W-40 Mineral (Petrol)							X					BP p.I.c., London, England
Duckhams Q Synthetic based (Diesel)				X								BP p.I.c., London, England
DuraBlend Diesel SAE 10W-40				X								The Valvoline Company, Lexington, KY/USA
Econo-Veritas HDE				X								Oelwerke Julius Schindler GmbH, Hamburg, Germany
Econo-Veritas HDE Plus				X								Oelwerke Julius Schindler GmbH, Hamburg, Germany
Econo-Veritas LS 10W-40				X								Oelwerke Julius Schindler GmbH, Hamburg, Germany
Elaion Full Performance											X	YPF S.A. Lubricantes & Especialidades, Buenos Aires/Argentina
Elan Turbo				X								Total Lubrifiants, Paris la Defense Cedex, France
Eldon's SHP Diesel							X					Eldon's S.A., Athens, Greece
Elf Competition ST				X				X				Total Lubrifiants, Paris la Defense Cedex, France
Elf Competition STI				X			X					Total Lubrifiants, Paris la Defense Cedex, France
Elf Performance Polytrafic 10W-40				X								Total Lubrifiants, Paris la Defense Cedex, France
Elf Prestigrade Diesel							X					Total Lubrifiants, Paris la Defense Cedex, France
Elf Prestigrade TS							X		X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Sporti TXI							X		X			Total Lubrifiants, Paris la Defense Cedex, France

Elf Super Sporti XJ								X	X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Turbo Diesel				X			X					Total Lubrifiants, Paris la Defense Cedex, France
EMKA Ecomax DLE 10W-40				X								EMKA Schmiertechnik GmbH, Heilbronn, Germany
EMKA Supergrade LL				X								EMKA Schmiertechnik GmbH, Heilbronn, Germany
EMKA Supergrade LL-X 10W-40				X								EMKA Schmiertechnik GmbH, Heilbronn, Germany
EmoSynt											X	Eggert Mineraloel AG, Elmshorn, Germany
EmoTron LL				X								Eggert Mineraloel AG, Elmshorn, Germany
Eneos M Euro-Touring				X								Nippon Oil Corporation, Tokyo, Japan
Energosint 2001				X								Energoinvest-Proizvodnja Maziva ddo, Sarajevo, Bosnia-Herzegovina
Engen Dieselube 3000 Super				X								Engen Petroleum Ltd., Cape Town, South Africa
Engen Formula SP				X								Engen Petroleum Ltd., Cape Town, South Africa
Engen Super 15W-40							X					Engen Petroleum Ltd., Cape Town, South Africa
Engen Super 20W-50										X		Engen Petroleum Ltd., Cape Town, South Africa
ENOC Protec Ultra				X				X				ENOC International Sales L.L.C., Dubai/United Arab Emirates
ESA Multilub 2004							X					ESA, Burgdorf, Switzerland
ESA Syntolub										X		ESA, Burgdorf,

Eco												Switzerland
ESA Syntolub Pilot											X	ESA, Burgdorf, Switzerland
Esso Superflo				X					X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultra				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultra 10W-40				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultra Turbo Diesel 10W-40				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultraflo 10W-40				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultraflo 15W-50								X				Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Uniflo Plus 15W-40							X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Essolube XTS 4 10W-40				X								Exxon Mobil Corporation, Fairfax, Virginia, USA
Eurol Biturbo				X								Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Eurol Integral SXT											X	Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Eurol Turbosynt 10W-40 SL/CF				X								Eurol BV, Nijverdal, Netherlands
EUROLUB GT 10W/40				X								Hunold Schmierstoffe GmbH, Eching, Germany
EUROLUB Multitec 10W/40				X								Hunold Schmierstoffe GmbH, Eching, Germany
Evva Galax FE				X								Evva-Schmiermittel-Fabrik,

												Margarethen/Moos, Austria
Evva Multi GFP							X					Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
Evva Multi SHPDO							X					Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
Evva Synth LL											X	Evva-Schmiermittel-Fabrik, Margarethen/Moos, Austria
F1 Master 501							X					Companhia Brasileira de Petroleo Ipiranga, Rio de Janeiro RJ, Brazil
Fenix BM Extra				X								NIS Fabrika maziva, Krusevac/Serbia
Fenix Superior							X					NIS Fabrika maziva, Krusevac/Serbia
Feu Vert Polysynthese 10W-40				X								Feu Vert, Dardilly Cedex, France
Fina Delta Superior							X					Total Lubrifiants, Paris la Defense Cedex, France
Fina Excel				X				X				Total Lubrifiants, Paris la Defense Cedex, France
Fina Kappa FE				X								Total Lubrifiants, Paris la Defense Cedex, France
Formula Turbo Multitec 3000 TX							X					BFT, Bonn, Germany
Forol SHPD-Max							X					Patting d.o.o., Varazdin, Croatia
Fortis Ultra							X					Chemol, Belgrade/Serbia
Fuchs Titan Formel MC SAE 5W-40											X	Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan							X					Fuchs Petrolub AG,

Formel Plus												Mannheim, Germany
Fuchs Titan Formula SAE 15W-40							X					Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan LD Extra				X								Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Supersyn Plus SAE 5W-40											X	Fuchs Petrolub AG, Mannheim, Germany
Fuchs TITAN SYN MC				X								Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Unic MC				X								Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Unic Plus MC				X								Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Unic Ultra MC				X								Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Universal HD 15W-40							X					Fuchs Petrolub AG, Mannheim, Germany
Galax Racing											X	Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galax Sint				X								Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galax Sint, SAE 10W-40				X								Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galax Unia							X					Rafinerija Nafte DOO Beograd, Belgrade/Serbia
Galaxis Extra 2				X								Kuttenkeuler GmbH, Cologne, Germany
Galp Energy Premium Plus				X								Petrogal S.A., Lisbon, Portugal
Galp Energy SP											X	Petrogal S.A., Lisbon, Portugal
Galp Formula 1 Plus											X	Petrogal S.A., Lisbon, Portugal
Galp Formula D 2000							X					Petrogal S.A., Lisbon, Portugal
Galp Formula SP									X			Petrogal S.A., Lisbon, Portugal

Galp Formula System							X					Petrogal S.A., Lisbon, Portugal
Galp Formula TD Plus											X	Petrogal S.A., Lisbon, Portugal
Galp Galaxia Ultra EC				X								Petrogal S.A., Lisbon, Portugal
Garatex				X								Chevron Texaco Technology Ghent/Gent, Zwijnaarde, Belgium
Gedol Long Drain DMO							X					Gedol International S.r.l., Cerreto Guidi (FI), Italy
Greatwall Pluto				X			X					Greatwall Lube Oil Co. Sinopec, Beijing, P. R. China
Green Arrow				X								Wuxi Luroda Petroleum Co., Ltd, Wuxi/P. R. China
Gulf Formula G	X									X	X	Gulf Oil International, London, England
Gulf GDI Extra (EP)											X	S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf MAX							X					Gulf Oil International, London, England
Gulf MAX Plus							X		X			Gulf Oil International, London, England
Gulf Super H (EP)							X		X			S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Super S				X								S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Superfleet Supreme							X					Gulf Oil International, London, England
Gulf TDI (EP)							X					S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf TEC				X								Gulf Oil International, London, England
Gulf TEC Plus				X								Gulf Oil International, London, England
Gulf Ultrasynth				X								Gulf Oil International, London, England

Hafa Mach 2				X								Hafa, Paris, France
Hafa Multigrade GS							X					Hafa, Paris, France
Hafa Turbo DI				X								Hafa, Paris, France
Hafa Turbo diesel				X								Hafa, Paris, France
Havoline Formula3							X	X	X			ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Formula3 Diesel							X					ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Formula3 Diesel Extra				X								ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Formula3 Synthetic											X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Formula3 X1 Extra				X				X				ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Synthetic											X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
HPX										X		FL Italia s.p.a., Villastellone (Torino), Italy
Hunold GT				X								Hunold Schmierstoffe GmbH, Eching, Germany
Idemitsu Zepro Racing SJ											X	Idemitsu Kosan Co., Ltd., Tokyo, Japan
Igol Process	X			X				X				Igol France, Amiens Cedex/France
Igol Process B4				X								Igol France, Amiens Cedex/France
Igol Protruck 100X, SAE 10W-40				X								Igol France, Amiens Cedex/France

Igol Trans Turbo 4X							X					Igol France, Amiens Cedex/France
INA 505.01											X	INA Maziva Rijeka, Rijeka, Croatia
INA Delta Sint				X								INA Maziva Rijeka, Rijeka, Croatia
INA Ultra											X	INA Maziva Rijeka, Rijeka, Croatia
Intercooler 400							X					Unil S.A., Saumur, France
IP Sintax Motor Oil Techno				X								Italiana Petroli (IP) S.p.A., Genoa/Italy
IP SUPER MOTOR OIL MULTIGRADE Benzina							X					Italiana Petroli (IP) S.p.A., Genoa/Italy
JB German Oil Formula XXL	X											JB German Oil, Neuhof, Germany
JB German Oil PowerF2 LL synthetics				X								JB German Oil, Neuhof, Germany
JB German Oil Super F1 fully synthetic											X	JB German Oil, Neuhof, Germany
Jumbo Vertex Gasoline Engine Oil							X					Pt. Jumbo Power International, Djakarta, Indonesia
Kendall Motor Oil Elite											X	Handel-Mij Noviol B.V., Nijmegen, Netherlands
KIXX Turbo RV 10W-40				X								GS-Caltex Corporation, Seoul 135-985, Rep. Korea
KTX Turbo Leichtlaufol				X								Muller Mineralole Handels-und Beratunggsgesllschaft mbH, Eschweiler, Germany
KunLun SL/CF											X	PetroChina Lubricant Company, Beijing, P.R. China
Labo Carat										X		Fuchs Labo Auto S.A., Rueil-Malmaison, France
Labo Rush TI				X								Fuchs Petrolub AG,

SAE 10W-40												Mannheim, Germany
Labo Syntha High Tech Synthese 5W-40				X								Fuchs Petrolub AG, Mannheim, Germany
Laike SL							X					Fujian Laike Petrochemical Co., Ltd., Nan An City, Fujian Province, 362321, P. R. China
LEOL-Ultra											X	Lebedyn Oil Processing Plant Ltd., Lebedyn, Sumy reg., Ukraine
Lingxian							X					Beijing Tongyi Petroleum Chemical Co., Ltd., Beijing, P. R. China
Liqui Moly Diesel High Tech											X	Liqui Moly GmbH, Ulm, Germany
Liqui Moly Diesel Leichtlauf				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Diesel Synthoil High Tech											X	Liqui Moly GmbH, Ulm, Germany
Liqui Moly Leichtlauf				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly MB Service Fill 1040 Motor Oil				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Meister-ol				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly refill oil				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Leichtlauf HC Motoroil											X	Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Leichtlauf Motorol				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Synthoil				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Profi Touring											X	Liqui Moly GmbH, Ulm, Germany

Liqui Moly Super Leichtlauf Motoroil				X								Liqui Moly GmbH, Ulm, Germany
Liqui Moly Synthoil Energy		X										Liqui Moly GmbH, Ulm, Germany
Liqui Moly Synthoil High Tech											X	Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech							X					Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech Diesel Spezialoil							X					Liqui Moly GmbH, Ulm, Germany
Liqui Moly Touring High Tech Motoroil HD							X					Liqui Moly GmbH, Ulm, Germany
Lotos							X					Grupa Lotos SA., Gdansk, Poland
Lotos Auto Diesel CF SAE 15W/40							X					Grupa Lotos SA., Gdansk, Poland
Lotos Dynamic		X										Grupa Lotos SA., Gdansk, Poland
Lotos Semisynthetic				X								Grupa Lotos SA., Gdansk, Poland
Lotos Semisyntetic Auto Diesel CF SAE 10W/40				X								Grupa Lotos SA., Gdansk, Poland
Lotos Semisyntetic SJ/CF SAE 10W-40				X								Grupa Lotos SA., Gdansk, Poland
Lotos Semisyntetic SL/CF SAE 10W-40				X								Grupa Lotos SA., Gdansk, Poland
Lotos SJ/CF SAE 15W-40							X					Grupa Lotos SA., Gdansk, Poland
Lotos SL/CF SAE 15W-40							X					Grupa Lotos SA., Gdansk, Poland
Lotos Traffic											X	Grupa Lotos SA.,

Turbodiesel CF 5W/40												Gdansk, Poland
Lubex Premium XT 10W-40				X								Belgin Madeni Yaglar Tic. Ve San. A.S., Gebeze Kocaeli, Turkey
Lubrax Tec Turbo				X								Petrobras Distribuidora S.A., Rio de Janeiro, Brazil
Lubroviscol Superior LL				X								Shell International Petroleum Co., London, England
Lubstar Turbo diesel									X			S.C. Lubrifin S.A., Brasov, Rumania
Lukoil Lux 5W-40											X	OAO LUKOIL, Moscow, Russia
Lukoil Prima				X								OOO Lukoil-Permnefteorgsintez, Perm/Osentsy, Russia
Lukoil-Lux			X							X		OAO LUKOIL, Moscow, Russia
Lunar Max Super Diesel Motor Oil							X					Comet Oil Philippines, Inc., San Juan, Metro Manila, Philippines

MULTIGRADE ENGINE OILS (SHEET 229.3) - BB00.40-P-0229-03A

i For use in vehicles/engines refer to ? Sheet 223.2

Product name	0W-30	0W-40	10W-40	5W-30	5W-40	5W-50	Customer, town/country
76 Pure Synthetic Motor Oil					X		ConocoPhillips, Costa Mesa, CA, USA
AD MDX Mega Plus 5W-40					X		AD Parts, S.L., Riudellots de Selva (Girona)/Spain
Addinol Extra light MV 038	X						Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super light MV 0546					X		Addinol Lube Oil GmbH, Leuna, Germany
Addinol Super power MV 0537				X			Addinol Lube Oil GmbH, Leuna, Germany

ad-Synt-Oil					X		Carat GmbH & Co. KG, Eschborn, Germany
Agip Eurosport					X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Extra HTS					X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sint 2000 Evolution		X			X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Sint Turbodiesel Evolution					X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Synthetic PC					X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Tecsint SL					X		ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Tecsint SX		X					ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agrol F1 Zenit	X						Agro Oil AB, Stockholm, Sweden
ALPINE Longlife SAE 5W-30				X			Mitan Mineralol GmbH, Ankum, Germany
Alpine topsynth					X		Mitan Mineralol GmbH, Ankum, Germany
Antar Excellia LDX 5W-40					X		Total Lubrifiants, Paris la Defense Cedex, France
AP Supreme Premium 9999 Synthetic					X		AP Oil International Ltd, Singapore, Singapore
Aral HighTronic					X		Aral Aktiengesellschaft, Hamburg, Germany
Aral SuperSynth		X					Aral Aktiengesellschaft, Hamburg, Germany
Aral SuperTronic G	X						Aral

							Aktiengesellschaft, Hamburg, Germany
Astris Motor Oil SPS				X			Astris S.A., Giornico, Switzerland
Autol Carrera					X		Agip Schmiertechnik GmbH, Wurzburg, Germany
Aviaticon Unique DC 5W/30					X		Finke Mineralolwerk GmbH, Visselhovede/Germany
Azmol Leader					X		Aot Azmol, Berdyansk, Ukraine
Bardahl XTC Syntronic 5W-40					X		Bardahl NL., Dordrecht, Netherlands
Blasol PSP 5W-40					X		Blaser Swisslube AG, Hasle-Ruegsau, Switzerland
BP Euro Plus					X		BP p.I.c., London, England
BP Visco 5000					X		BP p.I.c., London, England
BP Visco 5000 Turbo Diesel					X		BP p.I.c., London, England
BP Visco 7000		X					BP p.I.c., London, England
BP Visco 7000 GM	X						BP p.I.c., London, England
BP Visco 7000 Long Life	X						BP p.I.c., London, England
BP Visco 7000 M	X						BP p.I.c., London, England
BP Visco 7000 Special	X						BP p.I.c., London, England
BP Visco 7000 Sport		X			X		BP p.I.c., London, England
BP Visco 7000 Turbo Diesel		X					BP p.I.c., London, England
BP Visco 7000 Turbo Diesel Sport					X		BP p.I.c., London, England
Car Jack 5W-40 GSR					X		SIG Import GmbH, Dusseldorf/Germany
Carl Motorenol Power					X		Coparts Autoteile GmbH, Essen, Germany

Castrol DCO TOPUP	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol Edge 0W-30	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol Edge 0W-40		X					Lubricants UK Ltd, Technology Centre, Reading/England
Castrol Edge 5W-40					X		Lubricants UK Ltd, Technology Centre, Reading/England
Castrol Formula RS Power and Protection		X					Castrol Limited, GB Reading RG8 7QR, England
Castrol Formula SLX	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol Formula SLX LongTec	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 5 5W-40					X		Castrol Limited, GB Reading RG8 7QR, England
Castrol GTX 7 Dynatec					X		Castrol Limited, GB Reading RG8 7QR, England
Castrol Performance					X		Castrol Limited, GB Reading RG8 7QR, England
Castrol Magnatec Professional 5W-30				X			Lubricants UK Ltd, Technology Centre, Reading/England
Castrol SLX Professional 5W-40					X		Lubricants UK Ltd, Technology Centre, Reading/England
Castrol SLX Professional Longtec 0W-30	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol Super Racing		X					Lubricants UK Ltd, Technology Centre, Reading/England
Castrol Syntec 0W-30	X						Castrol Limited, GB Reading RG8 7QR, England

Castrol Syntec 0W-30 European Formula	X						Castrol Limited, GB Reading RG8 7QR, England
Castrol Syntec 5W-40					X		Castrol Limited, GB Reading RG8 7QR, England
Castrol TXT Softec 5W-40				X	X		Castrol Limited, GB Reading RG8 7QR, England
Castrol TXT Softec Plus 5W-30				X			Castrol Limited, GB Reading RG8 7QR, England
Cepsa Star Mega Synthetic 0W-30	X						Cepsa Lubricantes, S.A., Madrid, Spain
Cepsa Star Mega Synthetic 5W-30				X			Cepsa Lubricantes, S.A., Madrid, Spain
CONCEP-TECH HDC SAE 5W40					X		Swd Lubricants GmbH & CO. KG, Duisburg, Germany
CONCEP-TECH VS		X					Swd Lubricants GmbH & CO. KG, Duisburg, Germany
Consol Ultima					X		Vial Oil Ltd., Moscow, Russia
Cosmo Lio Royal					X		Cosmo Oil Lubricants Co., Ltd, Tokyo, Japan
CPC 9000 MB Motor Oil					X		Chinese Petroleum Corporation, Kaoshiung, Taiwan 806, Taiwan
Cyclon F1 Racing					X		Cyclon Hellas S.A., Maroussi, Greece
DBV Synthetik Motorenol 5W-40					X		Deutscher Brennstoffvertrieb GmbH, Wurzburg, Germany
Divinol Syntholight HC-FE 5W-30				X			Zeller + Gmelin GmbH & Co., Eislingen, Germany
Duckhams Q 5W-40 Fully Synthetic					X		BP p.I.c., London, England
Econo Veritas XL-HC					X		Oelwerke Julius Schindler GmbH, Hamburg, Germany
Elf Excellium LDX 0W-	X						Total Lubrifiants, Paris

30							la Defense Cedex, France
Elf Excellium LDX 5W-40					X		Total Lubrifiants, Paris la Defense Cedex, France
Engine Oil Power					X		Oelwerke Julius Schindler GmbH, Hamburg, Germany
ENOC Protec X-treme 5W-40					X		ENCO International Sales L.L.C., Dubai/United Arab Emirates
Esso Megatron 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultron					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultron (Fuel Economy)	X						Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultron 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultron SL 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Ultron Turbo Diesel 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Eurol Futura	X						Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
Eurolub Synt SAE 5W-40					X		Hunold Schmierstoffe GmbH, Eching, Germany
Feu Vert 100% Synthese 5W-40					X		Feu Vert, Dardilly Cedex, France
Fina First					X		Total Lubrifiants, Paris la Defense Cedex, France
FormulaShell Ultra					X		Shell International Petroleum Co., London, England

Fuchs Titan Supersyn SAE 5W-30				X			Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Supersyn SAE 5W-40					X		Fuchs Petrolub AG, Mannheim, Germany
Fuchs Titan Supersyn SL	X			X	X		Fuchs Petrolub AG, Mannheim, Germany
Galp Energy Plus					X		Petrogal S.A., Lisbon, Portugal
Galp Energy Ultra	X						Petrogal S.A., Lisbon, Portugal
Galp Formula XLD, SAE5W-30				X			Petrogal S.A., Lisbon, Portugal
Genesis Motor SL/CF 5W-40					X		Nippon Oil Corporation, Tokyo, Japan
Gold Chief					X		Shenzhen Sanjiu Fine Chemical Co., Ltd, Shenzhen, P. R. China
Gulf Formula G	X			X	X		Gulf Oil International, London, England
Gulf Formula S (EP)					X		S.A. Espanola de Lubrificantes, Madrid, Spain
Habot - Full Synthetic	X						Habot Marketing SA (Pty) Ltd., Krugersdorp, South Africa
Havoline Synthetic DS 0W-30				X			ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Havoline Ultra					X		ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
High Star					X		Addinol Lube Oil GmbH, Leuna, Germany
Igol Process Compact P				X			Igol France, Amiens - Cedex/France
Igol Process MB, SAE 0W-30	X						Igol France, Amiens - Cedex/France
Igol Symbol Ceramic 5W-40					X		Igol France, Amiens - Cedex/France
INA Millenium, SAE					X		INA Maziva Rijeka,

5W-40							Rijeka, Croatia
IP Sintiax Motor Oil Extreme	X						Italiana Petroli (IP) S.p.A., Genoa/Italy
Jomo Dreamer Motor Oil					X		Japan Energy Corporation, Minato-ku, Tokyo 105-5407, Japan
Kendall GT-1 Full Synthetic Motor Oil					X		ConocoPhillips, Costa Mesa, CA, USA
Labo RC	X						Fuchs Labo Auto S.A., Rueil-Malmaison, France
Liqui Moly Leichtlauf HD C7					X		Liqui Moly GmbH, Ulm, Germany
Liqui Moly Longtime High Tech				X			Liqui Moly GmbH, Ulm, Germany
Liqui Moly Synthoil Longtime	X						Liqui Moly GmbH, Ulm, Germany
Lotos Economic SL/CF					X		Grupa Lotos SA., Gdansk, Poland
Lotos Syntetic Auto Diesel CF					X		Grupa Lotos SA., Gdansk, Poland
Lotos Syntetic SL/SJ/CF/CD					X		Grupa Lotos SA., Gdansk, Poland
Lotos Trafic Turbodiesel CF 5W/40					X		Grupa Lotos SA., Gdansk, Poland
Lotos Trafic SL/CF					X		Grupa Lotos SA., Gdansk, Poland
Lubrax Sintetico					X		Petrobras Distribuidora S.A., Rio de Janeiro, Brazil
Lukoil Synthetic					X		OAO LUKOIL, Moscow, Russia
MANNOL Extreme					X		SCT-Vertriebs GmbH, Wedel, Germany
MANNOL Legend + Ester		X					SCT-Vertriebs GmbH, Wedel, Germany
MB 229.3 Engine Oil 000 989 82 01					X		DaimlerChrysler AG, Stuttgart, Germany
megol Motorenoel Power Synt			X				Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
megol Motorenoel Super Leichtlauf					X		Meguin GmbH & Co. KG Mineraloelwerke,

							Saarlouis, Germany
megol Motorenoel Super Leichtlauf	X						Meguin GmbH & Co. KG Mineraloelwerke, Multisynth Saarlouis, Germany
Meister-ol Leichtlauf-Motorenol 0W-40		X					Deutsche BP Aktiengesellschaft, Hamburg/Germany
Meister-ol Leichtlauf-Motorenol 5W-40					X		Deutsche BP Aktiengesellschaft, Hamburg/Germany
Midland Avanza					X		Oel-Brack AG, Hunzenschwil, Switzerland
Mobil 1 0W-40		X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil 1 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil 1 5W-50	X						Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil 1 Turbo Diesel 0W-40		X					Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil 1 Turbo Diesel 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil SHC Formula MB 5W-30				X			Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Special X 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Synt S 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Synt S Turbo Diesel 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Syst S					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil Syst S 5W-40					X		Exxon Mobil

							Corporation, Fairfax, Virginia, USA
Mogul Racing PRO					X		Paramo, a.s., Pardubice, Czech Republic
MOL Dynamic Star 0W-40		X					MOL-LUB Ltd., Almasfuzito, Hungary
MOL Dynamic Star 5W-40					X		MOL-LUB Ltd., Almasfuzito, Hungary
MOL Dynamic Synt 5W-40					X		MOL-LUB Ltd., Almasfuzito, Hungary
Morris Multilife					X		Morris & Co. Ltd., Shrewsbury, England
Motor Gold Supertec					X	Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany	
Motor Oil Plus 5W-40					X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Motorenoel Ultra Performance Longlife					X		Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
Motorex Profile M-XL 0W-30	X						Bucher AG Langenthal, Langenthal/Switzerland
Motorex Profile M-XL 5W-30				X			Bucher AG Langenthal, Langenthal/Switzerland
Motorex Select DX					X		Bucher AG Langenthal, Langenthal/Switzerland
Motorex Select SP-X 0530				X			Bucher AG Langenthal, Langenthal/Switzerland
Motorex Select SP-X 5W-40					X		Bucher AG Langenthal, Langenthal/Switzerland
Motorex Xperience FS-X		X					Bucher AG Langenthal, Langenthal/Switzerland
Motorex Xperience FS-X	X						Bucher AG

0W-30							Langenthal, Langenthal/Switzerland
Motul 6100 Synergie + 10W-40				X			Motul, Aubervilliers/France
Motul 8100 E-Tech 0W-40		X					Motul, Aubervilliers/France
Motul 8100 X-cess 5W-40					X		Motul, Aubervilliers/France
Motul 8100 X-Lite 0W-30	X						Motul, Aubervilliers/France
Motul 8100 X-max 5W-30				X			Motul, Aubervilliers/France
Motul H-Tech Multi Standard					X		Motul, Aubervilliers/France
Motul Specific MB 229.5 5W-30				X			Motul, Aubervilliers/France
Motul Synergie					X		Motul, Aubervilliers/France
Motul Synergie Ester + 0W-40		X					Motul, Aubervilliers/France
Multilub Super Synth	X						Koordination Globus-Betriebe, St. Wendel, Germany
New Process Fullsynth	X						New-Process AG, Tubach SG, Switzerland
Novolin Sint					X		NIS Refinery Novi Sad, Novi Sad/Serbia
Oest ETA Synthetik					X		Georg Oest Mineralolwerke GmbH & Co KG, Freudenstadt/Germany
Olympia Pro- Tech Fully Synthetic Engine					X		Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis/Germany
OMV full syn		X					OMV Refining & Marketing GmbH, Vienna, Austria
Opaljet 24 S					X		Unil S.A., Saumur, France
Optima HC Magnum					X		Oil Refinery Modrica, Modrica, Bosnia-Herzegovina
Optima Magnum Plus		X					Oil Refinery Modrica,

							Modrica, Bosnia-Herzegovina
OWS TXI Syntholube 5W-40					X		OWS, Lohfelden, Germany
Panolin Indy SV					X		Panolin AG, Madetswil, Switzerland
Panolin Racing Synth DC	X						Panolin AG, Madetswil, Switzerland
Parnas Evo Synthesis					X		Sakson S.A., Athens, Greece
Pennasol Super Pace					X		Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Pennzoil Performax					X		Pennzoil-Quaker State, Houston, Texas 77002, USA
Pennzoil Platinum European Formula					X		Pennzoil-Quaker State, Houston, Texas 77002, USA
Pentospeed	X						Deutsche Pentosin-Werke GmbH, Wedel, Germany
Pentospeed 0W-30 VS	X						Deutsche Pentosin-Werke GmbH, Wedel, Germany
Petronas Syntium 3000 S					X		Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Petronas Syntium 5000 FS		X					Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Petronas Syntium 900					X		Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Platinum Synthetic SL/CF 0W-30	X						Orlen Oil Sp. z o.o., Krakow, Poland
Platinum Synthetic SL/CF 5W/40					X		Orlen Oil Sp. z o.o., Krakow, Poland
Platinum Synthetic SM/SL/CF 5W/40					X		Orlen Oil Sp. z o.o., Krakow, Poland
PO Ultra 5W-40					X		Petrol Ofisi Anonim Sirketi, Istanbul, Turkey
POWEROIL					X		Power Oil e.K.,

HighTechSchmst.HD5W-40 Topsynth							Karlsfeld, Germany
Prista Ultra 5W-40					X		Prista Oil Ltd., Rousse, Bulgaria
Profi-Car synth-Tech XT					X		Profi-Tech GmbH, Gingen, Germany
Profi-Car ultra-Synth 4000	X						Profi-Tech GmbH, Gingen, Germany
Q European Engine					X		Pennzoil-Quaker State, Houston, Texas 77002, USA
Q8 Formula Excel SAE 5W-40					X		Kuwait Petroleum, Hoogvliet RT, Netherlands
Q8 Formula Special					X		Kuwait Petroleum, Hoogvliet RT, Netherlands
Quaker State DeLuxe	X						Oel-Brack AG, Hunzenschwil, Switzerland
Quaker State Synquest		X			X		Oel-Brack AG, Hunzenschwil, Switzerland
raitec t 5					X		Raiffeisen Central-Genossenschaft Nordwest eG, Munster, Germany
Ravenol HPS Hypersynth SAE 5W-30				X			Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Ravenol Hydrocrack Synth. HCS SAE					X		Ravensberger Schmierstoffvertrieb GmbH, Werther, 5W-40 Germany
Ravenol Super Synthetic SSO 0W-30	X						Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Ravenol VSI SAE 5W-40					X		Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Repsol Elaion Full Performance SM					X		YPF S.A. Lubricantes & Especialidades,

							Buenos Aires/Argentina
Repsol Elite Competicion					X		Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Repsol Elite Cosmos		X					Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
ROWE Synth RS 5W-40 i					X		ROWE Mineralolwerk GmbH, Bubenheim, Germany
Selenia Digitech	X						FL Selenia s.p.a., Villastellone (Torino), Italy
Selenia Perform				X			FL Selenia s.p.a., Villastellone (Torino), Italy
Selenia WR 5W-40					X		FL Selenia s.p.a., Villastellone (Torino), Italy
Shell Helix Diesel Ultra		X		X	X		Shell International Petroleum Co., London, England
Shell Helix Plus G-B025					X		Shell International Petroleum Co., London, England
Shell Helix Plus S					X		Shell International Petroleum Co., London, England
Shell Helix Ultec		X					Shell International Petroleum Co., London, England
Shell Helix Ultra		X		X	X		Shell International Petroleum Co., London, England
Shell Helix Ultra AB				X			Shell International Petroleum Co., London, England
Shell Helix Ultra AL				X			Shell International Petroleum Co., London, England

Statoil GT S 5W-40					X		Svenska Statoil AB, Stockholm, Sweden
Statoil LazerWay 5W-40					X		Svenska Statoil AB, Stockholm, Sweden
Statoil LazerWay TDI 5W-40					X		Svenska Statoil AB, Stockholm, Sweden
Statoil LazerWay X		X					Svenska Statoil AB, Stockholm, Sweden
Statoil Pro Synthetic 5W-40					X		Svenska Statoil AB, Stockholm, Sweden
S-Tronic					X		Kuttenkeuler GmbH, Cologne, Germany
swd Primus HDC					X		Swd Lubricants GmbH & Co. KG, Duisburg, Germany
swd Primus Ultra		X					Swd Lubricants GmbH & Co. KG, Duisburg, Germany
swd Primus VS					X		Swd Lubricants GmbH & Co. KG, Duisburg, Germany
Syncon High Performance Synthetic					X		ConocoPhillips International Inc., Singapore, Singapore
Synt 5W-40					X		Hunold Schmierstoffe GmbH, Eching, Germany
Synt-XL; SAE 5 W -40					X		Muller Mineralole Handels-und Beratungsgesellschaft mbH, Eschweiler/Germany
Tamoil Sint Future Prestige (I)	X						Tamoil Petroli S.p.A., Milan, Italy
Tamoil Sint Future Racing					X		Tamoil Petroli S.p.A., Milan, Italy
Teboil Diamond Plus				X			OY Teboil AB Suomen Petrooli Oy, Hamina/Finland
Tempo 8000-2					X		Shanghai Tempo Petrochem Co., Ltd., Shanghai 200070, P. R. China
Top Evolution					X		TOP OIL Products Company, Burlingame,

							CA, USA
Tor Hypersynth					X		De Oliebron B.V., Zwijndrecht, Netherlands
Total activa 9000					X		Total Lubrifiants, Paris la Defense Cedex, France
Total quartz 9000					X		Total Lubrifiants, Paris la Defense Cedex, France
Triathlon Sprint					X		Adolf Wurth GmbH & Co. KG, Kunzelsau, Germany
Ultrasyn Plus		X					Kuttenkeuler GmbH, Cologne, Germany
Unicorn Ultrasynt					X		Unicorn Oil Company Pte Ltd, Singapore, Singapore
Unil Opal Opaljet 32 S	X						Unil S.A., Saumur, France
Unil Synth					X		Unil Germany GmbH, Stuttgart, Germany
Unimot Synth 9					X		GB Lubricants Limited, Gateshead, England
Valvoline Durablend MXL					X		The Valvoline Company, Lexington, KY/USA
Valvoline SynPower				X			The Valvoline Company, Lexington, KY/USA
Valvoline SynPower 0W-40		X					The Valvoline Company, Lexington, KY/USA
Valvoline SynPower 5W-40					X		The Valvoline Company, Lexington, KY/USA
Valvoline SynPro 5W-40					X		The Valvoline Company, Lexington, KY/USA
Valvoline SynPro motor oil		X					The Valvoline Company, Lexington, KY/USA
Veritas Syntolube 0W-40		X					Oelwerke Julius Schindler GmbH,

							Hamburg, Germany
Wako's ex Synthe					X		Wako Chemicals Co., Ltd, Odawara, Japan
Wako's Super Synthe	X						Wako Chemicals Co., Ltd, Odawara, Japan
Wintershall ViVA 1 Longlife				X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall ViVA 1 topsynth					X		SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wintershall ViVA 1 topsynth alpha				X			SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wolf Masterlube Synflow DC					X		Wolf Oil Corporation N.V., Hemiksem, Belgium
Wolf Masterlube Synflow Plus		X					Wolf Oil Corporation N.V., Hemiksem, Belgium
Yacco VX 1000					X		Yacco SAF, Saint-Pierre-les-Elbeuf, France
Yacco VX 600 5W-40					X		Yacco SAF, Saint-Pierre-les-Elbeuf, France
York 748	X						Ginouves Georges S.A., La Farlede, France
YPF Elaion Full Performance SM					X		YPF S.A. Lubricantes & Especialidades, Buenos Aires/Argentina
ZIC XQ					X		SK Corporation, Seoul KR/Rep. Korea

MULTIGRADE ENGINE OILS (SHEET 229.5) - BB00.40-P-0229-05A

For use in vehicles/engines refer to ? Sheet 223.2

Product name	0W-30	0W-40	5W-30	Customer, town/country
Addinol Super power MV 0537			X	Addinol Lube Oil GmbH, Leuna, Germany
Adnoc Image, SAE 5W-30			X	Adnoc Distribution, Abu Dhabi/United Arab

				Emirates
Agip Formula LL DC			X	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
ALPINE Longlife SAE 5W-30			X	Mitan Mineralol GmbH, Ankum, Germany
Aral SuperTronic G	X			Aral Aktiengesellschaft, Hamburg, Germany
Aviaticon Unique DC 5W/30			X	Finke Mineralolwerk GmbH, Visselhovede/Germany
BP Visco 7000 GM	X			BP p.l.c., London, England
Castrol DCO TOPUP	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Edge 0W-30	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Formula SLX	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Formula SLX LongTec	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol SLX Professional Longtec 0W-30	X			Castrol Limited, GB Reading RG8 7QR, England
Castrol Syntec 0W-30 European Formula	X			Castrol Limited, GB Reading RG8 7QR, England
Divinol SYNTHOlight MB SAE 5W-30			X	Zeller + Gmelin GmbH & Co., Eislingen, Germany
Elf Excellium 0W-30	X			Total Lubrifiants, Paris la Defense Cedex, France
Elf Excellium 229.5 5W-30			X	Total Lubrifiants, Paris la Defense Cedex, France
Elf Excellium Full Tech 0W-30	X			Total Lubrifiants, Paris la Defense Cedex, France
FormulaShell Ultra AB			X	Shell International Petroleum Co., London, England
Galax Syntec, SAE 5W-30			X	Rafinerija Nafte DOO Beograd, Belgrade/Serbia

Galp Formula XLD, SAE 5W-30			X	Petrogal S.A., Lisbon, Portugal
Gulf Avantgarde K 5W-30			X	S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Formula Extreme 0W-30	X			S.A. Espanola de Lubrificantes, Madrid, Spain
Gulf Formula GX, SAE 5W-30			X	Gulf Oil International, London, England
Igol Process Compact P			X	Igol France, Amiens - Cedex/France
INA Futura MB			X	INA Maziva Rijeka, Rijeka, Croatia
Labo MB 229.5			X	Fuchs Labo Auto S.A., Rueil-Malmaison, France
Liqui Moly Longtime High Tech			X	Liqui Moly GmbH, Ulm, Germany
megol Motorenoel New Generation			X	Meguin GmbH & Co. KG Mineraloelwerke, Saarlouis, Germany
Midland Crypto 5W-30			X	Oel-Brack AG, Hunzenschwil, Switzerland
Mobil 1 0W-40		X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil 1 Turbo Diesel 0W-40		X		Exxon Mobil Corporation, Fairfax, Virginia, USA
Mobil SHC Formula MB 5W-30			X	Exxon Mobil Corporation, Fairfax, Virginia, USA
Motorex Profile M-XL 5W-30			X	Bucher AG Langenthal, Langenthal/Switzerland
Motul 8100 X-max 5W-30			X	Motul, Aubervilliers/France
Motul Specific MB 229.5 5W-30			X	Motul, Aubervilliers/France
OMV full syn MB			X	OMV Refining & Marketing GmbH, Vienna, Austria
OMV full syn plus SAE 5W-30			X	OMV Refining & Marketing GmbH, Vienna, Austria
Panolin Exclusive BD			X	Panolin AG, Madetswil, Switzerland

Pennzoil Platinum European Formula Ultra			X	Pennzoil-Quaker State, Houston, Texas 77002, USA
Pentospeed 0W-30 VS*	X			Deutsche Pentosin-Werke GmbH, Wedel, Germany
Petronas Syntium 3000 LL			X	Petroliam Nasional Berhad, Kuala Lumpur, Malaysia
Premium Synthetik Motorenol			X	DaimlerChrysler AG, Stuttgart, Germany
Q European Engine Ultra			X	Pennzoil-Quaker State, Houston, Texas 77002, USA
Ravenol HCL 5W-30			X	Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
REPSOL ELITE COMMON RAIL 5W30			X	Repsol YPF Lubricantes Especialidades, S.A., Mostoles - Madrid/Spain
Shell Helix Ultra AB			X	Shell International Petroleum Co., London, England
Statoil LazerWay B 5W-30			X	Svenska Statoil AB, Stockholm, Sweden
Texaco Havoline Ultra BM 5W-30			X	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Tor Synthetic LL			X	De Oliebron B.V., Zwijndrecht, Netherlands
Total Activa Energy 9000 0W-30	X			Total Lubrifiants, Paris la Defense Cedex, France
Total Quartz 229.5 5W-30			X	Total Lubrifiants, Paris la Defense Cedex, France
Total Quartz Energy 9000 0W-30	X			Total Lubrifiants, Paris la Defense Cedex, France
Valvoline SynPower MB			X	The Valvoline Company, Lexington, Kentucky, USA
Valvoline SynPower MXL			X	The Valvoline Company, Lexington, Kentucky, USA
Wintershall ViVA 1 Longlife			X	SRS Schmierstoffe Vertrieb GmbH, Salzbergen, Germany

Yacco VX 1600			X	Yacco SAS, Saint-Pierre-les-Elbuf/France

GENERAL GEAR OILS - BB00.40-P-0231-00A

General information

The gear oils approved for assemblies installed in MB vehicles are classified according to their application into:

Hypoid gear oils Sheet 235.0/.6/.7/.8/.9.20

Gear oils Sheet 235.1/. 4/. 5/.10/. 11 /. 12/.13/. 15/.27/.61

Automatic transmission fluids (ATF)

Sheets 236.1/.2/.3/.5/.6/.7/.8/ Sheet 236.9/.10/.11/.20/.81

Frequently the "gear oils" fulfill multifunctional requirements, which is why they are used in a wide variety of transmission designs and hydraulic systems. However, where very specific technological properties of the transmission oil are required, special transmission oils had to be formulated for these major assemblies and these are listed on separate sheets of the Specifications for Operating Fluids and explain the large number of sheets for transmission oils.

The Mercedes-Benz standard for the corresponding lubricant quality and the area of application for assemblies installed in MB vehicles are documented in the various sheets.

The overviews on Sheets 231.1/.2/.3 provide the allocation of the operating fluid sheets (lubricant quality) to their use in the respective assemblies.

Requests

Gear oils are, like all lubricants, design-specific materials which only fulfill their task best if they are perfectly matched to the materials in tribological contact with them.

These specific material requirements can be subdivided into structural, technological and material requirements and are the primary properties that vehicle gear oils have to fulfill.

The general requirements, which are not any less important, are classified into shelf life, environmental compatibility, worldwide availability, economy and the constant quality of the guaranteed lubricant properties, which must meet the Mercedes-Benz standards worldwide.

Disposal

All approved gear oils, either fresh oil or used oil, are valuable substances which can be reused using the appropriate recycling method for the material. The detailed disposal methods can be found in the waste guidelines for the countries.

1. Hypoid gear oils

   Hypoid gear oils contain a high level of EP/AW additives (Extreme Pressure/Antiwear) and a highly viscous base oil to prevent seizure when the hypoid gears mesh (mixed and boundary friction conditions) and to ensure a high degree of protection against wear. The compatibility with radial shaft seals is regarded as critical with such high concentrations of additives because the P/S additive systems become thermally unstable at temperatures from 130°C to 140°C and this may lead to sludging of the hypoid oil. The resultant deposits on the radial shaft seals then generally lead to thermal overload and this in turn leads to leakage in this component.

   The tooth engagement conditions of the hypoid gears result in a high proportion of sliding and a low hydrodynamic proportion of tooth engagement between the pinion and ring gear. Due to the high tribological load compared to adhesive wear (seizure) and pitting, the performance of hypoid gear oils must be particularly high with respect to these types of wear. The formula of the oils is therefore determined by a high concentration of EP/AW additives and a highly viscous base oil. Alternative oils, e.g. engine oils, cannot be used for these drive types. Proof of performance that an oil fulfills the requirements of DaimlerChrysler AG is provided by internal tests. However, the hypoid gear oils must at least correspond to the US military specification MIL-L-2105 B/C/D and must be classed GL-5 in the quality grade according to API (American Institute of Petroleum).

   1.7 Viscosity requirements

   The cold flow behavior is only specified for SAE, ... oils. Here, the limits apply according to SAE J 306 c, according to which the dynamic viscosity may be max. 150,000 mPas at -40°C for oils and at -12°C for oils. As a result of the tendency to form deposits in the transmission, the polymer content is limited to max.

   1 percent by weight for pour point reducers. Polymers as VI improvers for thickening low-viscosity base oils are not permitted. The kinematic viscosity at 100°C must be at least 16.5 mm^2 /s.

2. Transmission oils, **sheet 235.1**

   The additive and viscosity properties of the transmission oils are adjusted so that they meet all the requirements placed on manual transmissions with steel/molybdenum synchronization, spur gear axles, MB and ZF transfer cases and reversing gears. Among other things, this results in the fact that the oils ensure a defined friction coefficient of the synchronizer elements, even after a high number of shift operations, without crunching noises.

   With gear drives and roller bearings, the adhesive wear (seizure) and pitting in particular should be minimized as far as possible.

   2.1 Viscosity requirements

   The cold flow behavior is only specified for SAE, 80W, ...oils. Here, the limits according to SAE J 306 c apply, according to which the dynamic viscosity may be max. 150,000 mPas at -40°C for oils, at -26°C for oils and at -12°C for oils. Due to the formation of deposits in the transmission, the polymer content is limited to max. 1 percent by weight for pour point reducers. Polymers as VI improvers for thickening

low-viscosity base oils are not permitted. The kinematic viscosity at 100°C 2 must be at least 9.5 mm /s. In hot zones, gear oils of SAE grade 90 are also permitted.

2.2 **Alternative transmission lubricants** for commercial vehicle synchromesh transmissions which are operated with transmission oils as per sheets 235.1, 235.5.

If there are no gear oils according to Sheet 235.1 and 235.5 available, the following engine oils can also be used as alternatives:

In a moderate climate, engine oils of SAE-grade 30 as per sheet 235.12

In tropical climate, engine oils of SAE-grade 40 as per sheet 235.12

2.3 Fully synthetic transmission oil, **sheet 235.4**

Completely synthetic gear oils are imperative for the Unimog manual transmission UG 3/40, UG 3/65 and the PTO transmission -as of the vehicle end No. ...179909 -. Older vehicles can have their oils changed from gear oils according to Sheet 235.1 to gear oils according to Sheet 235.4 when an oil change is due.

The gear oils correspond to the ZF lubricant specifications TE-ML01 and TE-ML02 and are consequently alternatives to the gear oils according to Sheet 235.1 in all synchronized ZF manual transmissions installed in MB vehicles, with and without intarders. Furthermore, the approval extends to the MB transfer case VG 2400 without oil cooler. Due to the favorable viscosity/temperature characteristics, a good cold-shifting response and, due to the composition of the transmission oil, a good thermal/oxidative stability of the oil at high transmission oil temperatures can be expected.

2.4 Transmission oils, **sheet 235.5**

The gear oils are approved for MB and ZF manual transmissions with steel/molybdenum synchronization, MB and ZF transfer cases and corner gears.

The transmission oils have a low chlorine content as well as a potential for lower oil temperatures under certain operating conditions.

2.5 Transmission oils, sheet **235.10**

The partly synthetic gear oils are approved for the commercial vehicle manual transmission Model G16/G28, for the passenger vehicle front-wheel-drive manual transmission SG 150/180 (A class) as well as for all passenger vehicle in-line transmissions of the model series 717.4 as of transmission serial number 7 340 241.

Due to the favorable viscosity/temperature characteristics, a very good cold-shifting response and, due to the composition of the transmission oil, a good thermal/oxidative stability of the oil at high transmission oil temperatures can be expected.

With regard to the use in passenger vehicle front-wheel drive manual transmissions/in-line transmissions, which are also installed in cross-country vehicles, the approved gear oil is usually only used in the event

of repairs or for service fills.

2.6 Transmission oils, **sheet 235.11**

The fully synthetic gear oils are approved for all MB commercial vehicle manual transmissions installed in MB vehicles with steel/molybdenum synchronization with and without oil coolers, in MB transfer cases with and without oil coolers as well as in ZF manual transmissions with steel/molybdenum synchronization.

Due to the favorable viscosity/temperature characteristics, a good cold-shifting response and, due to the composition of the transmission oil, a good thermal/oxidative stability of the oil at high transmission oil temperatures as well as a fuel savings potential depending on the operating conditions can be expected.

2.7 Engine oils, **sheet 235.12**

The engine oils must be used with a common oil system for transmissions used in tropical countries, and for manual transmissions with a torque converter and clutch unit. These engine oils display the very high seizure resistance required for use in transmissions. The oils need not comply with the engine oil pour point specifications in these Specifications for Operating Fluids.

2.8 Engine oils, **sheet 235.27**

Commercial vehicle retarder oils: the products listed in the tables apply to commercial vehicle transmissions: see MB Specifications for Operating Fluids 231.2. The engine oils are suitable for retarder use. The oils need not comply with the engine Specifications for Operating Fluids 231.2. The engine oils are suitable for retarder use. The oils need not comply with the engine oil pour point specifications in these Specifications for Operating Fluids.

3. Automatic transmission fluids (ATF), **sheet 236.1/.2/.3/.5/.6/.7/.8/.81/.9/.10/.11/.12/.13/.20**

ATFs are comparatively low-viscosity gear oils which, due to their universal use potential as a gear oil or a hydraulic fluid, can cover a wide spectrum of applications. The ATFs in the individual their universal use potential as a gear oil or a hydraulic fluid, can cover a wide spectrum of applications. The ATFs in the individual sheets differ essentially due to their inherent friction coefficients in tribological contact. This property predestines these oils as function fluids for automatic transmissions whose ease of shifting, among other things, is considerably affected by the friction coefficient of the ATF. Therefore, to achieve optimum performance of the vehicles, only the ATF quality (sheet no.) assigned to the major assembly is to be used. The individual ATF qualities will be described in greater detail below.

3.1 Automatic transmission fluids (ATF), **sheet 236.1**

The approved ATF correspond to the currently no longer valid GM specification Dexron II-D or the currently valid GM specification Dexron III.

The field of application of these ATF includes MB automatic transmissions without controlled torque converter lockup clutch in passenger cars, ZF Ecomat transmissions, Allison automatic transmissions, Voith-Diwa transmissions and MB automatic transmissions in commercial vehicles and busses except

W4B035.

3.2 Automatic transmission fluids (ATF), **sheet 236.2** , for MB passenger car and commercial vehicle transmissions with non-ferrous metal synchronization except front-wheel drive manual transmissions of the A-Class (see Section 2.5, Sheet 235.10), Allison transmission, commercial vehicle power steering, hydraulic fan drive.

The ATF must meet all the requirements of the transmissions with nonferrous metal synchronization. These include, in particular, wear protection against pitting and seizure as well as a defined friction coefficient of the synchronizer components that is as constant as possible over the entire service life. As a hydraulic fluid, the ATF is used for hydraulic power transmission and for protecting the hydraulic assemblies from wear. The seal compatibility must be ensured with all elastomer materials used.

If the approved ATF are not available, engine oils according to sheet 227.0, SAE 10W or, depending on the outside temperature, 20W-20 can be used in the above-mentioned synchronized manual transmissions as a makeshift measure (queries should be directed to the Abt. Betriebstoffe EP/QWB (EP/QWB Operating Fluids Dept.).

The approved ATF according to Sheet 236.2 correspond to the currently no longer valid GM specification Type A Suffix A. The kinematic fresh oil viscosity at 100°C must be at least 7.0 mm^2 /s, after shearing (as per CEC- TLPG 7) at least 6.0 mm^2 s.

3.3 Steering gear oil, **sheet 236.3** , for all commercial vehicle steering systems, except vans T0 and T1N, power steering systems for passenger cars, except

S-Class W220, power pack of the A-Class, and cross-country vehicles, manual steering L 075 Z for passenger cars and manual steering in cross-country vehicle.

In the S class W220, in the Power-Pack of the A class as well as in the Transporters T0 and T1N as of/below outside temperatures of 25°C the hydraulic fluids according to sheet 345.0 must be used.

3.4 Automatic transmission fluids (ATF) and/or engine oils, **sheet 236.5** , for Allison transmission HAT 700

The oils listed here correspond to the Allison-C4 specification. Allison automatic transmissions in makes AT 500, MT 600, S1000, S2000, World Transmission MD 3000, HD 4000 must only be filled with the oils specified in Sheet 236.9 or TES 295.

[i] If prior to starting the vehicle the gear oil temperature is below the critical temperature for the oil used, then either the gear oil should be prewarmed or the transmission should be warmed up while in neutral.

Automatic transmissions in the model series CLBT 750 must only ever be filled with oils according to Sheet 236.5. Under extreme operating conditions or for off-road use and/or with outside temperatures higher than 30°C an engine oil of SAE grade 30 and/or 15W-40 from Sheet 236.5 should be used. Depending on the outside temperature during vehicle operation, the oils used must be selected from the following diagram according to their SAE viscosity class and/or Dexron specification:

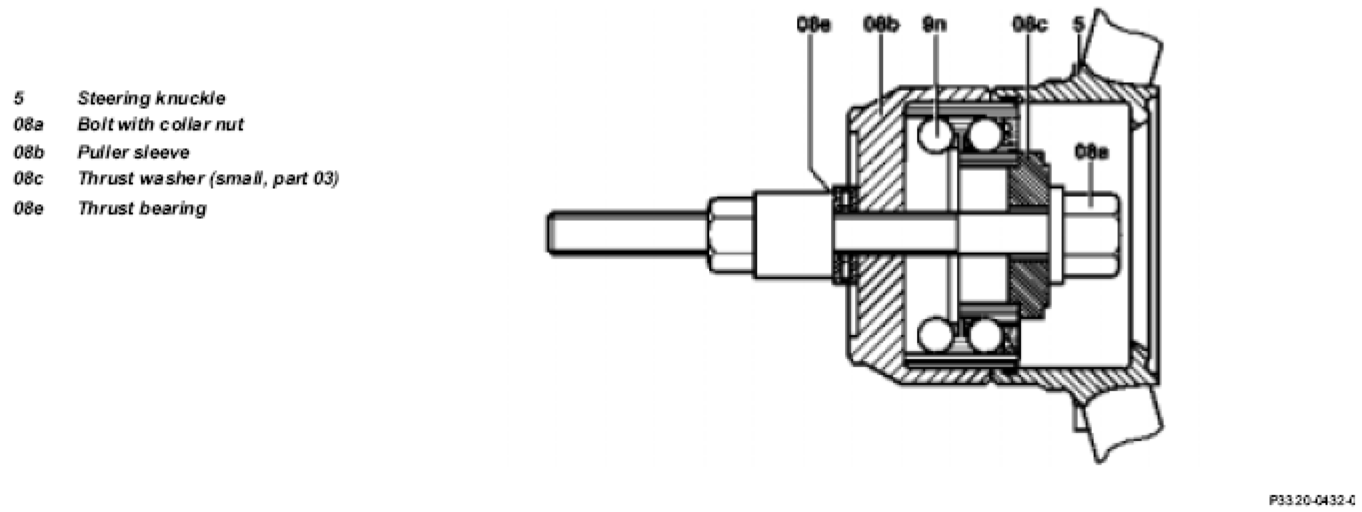


Fig. 644: Automatic Transmission Fluid Sheet

3.5 Automatic transmission fluid (ATF), **Sheet 236.6 and 236.7** , for MB automatic transmissions without regulated torque converter lockup clutch in passenger cars and commercial vehicles and buses (W4B035 only as of major assembly end no. 005733), ZF Ecomat transmissions, Voith-Diwa transmissions, commercial vehicle and cross-country vehicle power steering systems. If the approved ATF according to sheet 236.2 are not available, ATF according to sheet 236.6 can be used in synchronized passenger vehicle manual transmissions, except GL 76/30-5 and GL 275E (the two sports transmissions always require ATF according to sheet 236.6) as a makeshift measure.

The approved ATF according to Sheet 236.6 and 236.7 correspond to the currently no longer valid GM specification Dexron II-D. The kinematic fresh oil viscosity at 100°C must be at least 7.0 mm^2/s, after shearing (as per CEC- TLPG 7) at least 6.0 mm^2/s.

3.6 Automatic transmission fluid (ATF), **Sheet 236.8** , for ZF Ecomat transmissions, Voith-Diwa transmissions, MB automatic transmissions in commercial vehicles and buses except W4B035 and MB automatic transmissions without regulated torque converter lockup clutch in passenger cars (only in arctic climates).

The approved ATF correspond to the no longer valid GM specification Dexron II-E, Allison C4, Voith lubricant lists G 607 and G 1363 as well as ZF lubricant specifications TE-ML 14.

Automatic transmission fluid (ATF), **sheet 236.81** , for MB automatic transmissions without controlled torque converter lockup clutch in passenger cars, MB automatic transmissions in commercial vehicles and buses except W4B 035 as well as ZF Ecomat transmission, Voith-Diwa transmission.

The approved ATF corresponds to the ZF lubricant specifications TE-ML 09, TE-ML 14 and the Voith lubricant lists G 607 and G 1363.

Automatic transmission fluid (ATF), **Sheet 236.9** , for MB automatic transmissions without regulated torque converter lockup clutch in passenger cars, ZF Ecomat transmissions, Voith-Diwa transmissions, Allison transmissions.

The ATF correspond to the valid GM specification Dexron III, Voith lubricant lists G 607 and ZF lubricant specification TE-ML 14.

3.9 Automatic transmission fluid (ATF), **Sheet 236.10** , for MB automatic transmissions with and without regulated torque converter lockup clutch (GKUB) in passenger vehicles. This ATF is provided ex works as lifetime oil in all MB automatic transmissions with regulated torque converter lockup clutch - model series 722.6 - in passenger cars. For repair work, only the ATF quality specified in sheet 236.10 may be used for refilling in this new generation of automatic transmissions, and this can be obtained in a 1 liter container under the part no. 001 989 2103.

All MB automatic transmissions without regulated torque converter lockup clutch in passenger vehicles can either be filled with the ATF according to Sheet 236.10 or the ATF according to the Sheets 236.1/.6/.7/.81/.9.

3.10 Automatic transmission fluids (ATF), **sheet 236.11** , for ZF automatic transmission "IF 4 HP 20" and the automatic transmission oil circuit of the VW automatic transmission "AG4"

The approved ATF are usually only used in the event of repair or for refilling.

3.11 Automatic transmission fluids (ATF), **sheet 236.12** , for 7-gear automatic transmission oils (ATF), is also downwards-compatible for all 5-gear automatic transmissions.

3.12 **Sheet 236.13** , repair solution for MB automatic transmissions without regulated torque converter lockup clutch in passenger cars with the complaint of "double harsh engagement after engaging drive mode D", the MB automatic transmission fluid - part no:.

A 001 989 2303 11 - and/or the ATF "ATF MB 274" from Exxon Mobil Corporation, Fairfax, Virginia, USA, must be used. The ATF "Shell ATF MB" and/or the MB automatic transmission fluid with the part no.: A 001 989 0703" previously approved for the above-mentioned application must no longer be used, but can be used up as an ATF for oil changes necessary as a result of maintenance.

3.13 Automatic transmission fluids (ATF), **sheet 236.20** , for CVT transmissions that are used in Mercedes-Benz A-class and B-Class vehicles with CVT transmission, model 169, 245 with transmission 722.8

SPECIFIED GEAR OILS (CARS, CROSS-COUNTRY VEHICLES) - SURVEY - BB00.40-P-0231-01A

• **Should be used**

o **Can be used**

Passenger car, sheets 235.0 to 235.61

Major assembly	SAE grade	Sheet No.					
		235.0	235.1	235.7	235.10	235.15	235.61
Front axle (4Matic)	85 W-90, 90	o		•			

Rear axle (standard differential)	85 W-90, 90	o		•			
Rear axle AMG model 209.377/477, 211.077/277, 219.376/377, 230.472/474/479						•	
Rear axle with differential lock, model 164	75W-85					•	
Differential with limited slip	85W-90			•			
Mechanical steering	85 W-90, 90	•					
Manual transmission as of transmission number 7 340 241 (designs 717.4 and 716.6)	75 W-80W				•		
Manual transmission SG 150/180 (design 716.5)	75 W-80W				•		

Passenger car, sheets 236.1 to 236.81

Major assembly	**SAE grade**	**Sheet No.**											
		236.1	**236.2**	**236.3**	**236.6**	**236.7**	**236.8**	**236.81**	**236.9**	**236.10**	**236.12**	**236.13**	**236.20**
Transfer case (4MATIC), model 124	ATF				•								
Transfer case (4MATIC), model 163, 210	ATF									•			
Transfer case (4MATIC), model 164, 251	ATF										•		
Transfer case (4MATIC), model 203,	ATF											•	

211, 220													
Manual steering L075Z	ATF			•									
Power steering	ATF			•									
Manual transmission Sheet 236.6 not for GL76/30-5, GL275E up to transmission sequence number 7 340 240 (model 717.4 (Mercedes transmission))	ATF		•		o								
MB 4 and 5-gear stage automatic transmission without controlled torque converter lockup clutch (WUK) (models 722.3/4/5) Sheet 236.8 only for arctic climate	ATF	•			•	•	o	•	•	•	•		
MB 5-gear stage automatic transmission with controlled torque converter lockup clutch (WUK) for vehicles with rear-wheel	ATF									•	•		

drive (model 722.6)													
MB 5-gear stage automatic transmission with controlled torque converter lockup clutch (WUK) for vehicles with front-wheel drive (model 722.7)	ATF									•			
MB 7-gear stage automatic transmission with controlled torque converter lockup clutch (GKUB) (model 722.9)	ATF										•		
CVT transmission	ATF												•

Cross-country vehicle, sheets 235.0 to 235.11

Major assembly	SAE grade	Sheet No.					
		235.0	235.1	235.7	235.10	235.61	235.61
Axles	85 W-90, 90	•					
Manual transmission as of transmission serial number 7 340 241	75 W-80W				•		
Transfer case Not for transfer case (VG) 150 E	80, 80 W 80 W/85 W (Hot zones SAE 90, 85 W-90)		•				

Transfer case VG150 E	75W-90W					•	
Model 463.270/271	75W-140						•

Cross-country vehicle, sheets 236.1 to 236.12

Major assembly	SAE grade	Sheet No.									
		236.1	236.2	236.3	236.6	236.7	236.8	236.81	236.9	236.10	236.12
Mechanical steering	ATF			•							
Power steering	ATF			•	•	•					
MB manual transmission	ATF		•		o						
MB 4 and 5-gear stage automatic transmission without controlled torque converter lockup clutch (WUK) (models 722.3/4/5) Sheet 236.8 only for arctic climate	ATF	•			•	•	o	•	•	•	•
MB 5-gear stage automatic transmission with controlled torque converter lockup clutch (GKUB) (model 722.6)	ATF									•	•

SPECIFIED GEAR OILS (COMMERCIAL VEHICLES) -OVERVIEW - BB00.40-P-0231-02A

⚠ **For Allison transmissions, it is absolutely essential to observe the application instructions under point 3.4!**

Commercial vehicles, Sheet 235.0 to 235.27

Major assembly	**SAE grade**	**Sheet No.**												
		235.0	**235.1**	**235.4**	**235.0235**	**235.6**	**235.8**	**235.9**	**235.10**	**235.1**	**235.12**	**235.123**	**235.20**	**23**
Hypoid axle	85 W-90, 90	•				•	•						o	
Spur gear axle ZF transfer case Fuller transmission	80, 80 W 80 W/85 W (Hot zones SAE 90, 85 W-90)		•		•									
Planetary axle	85 W-90, 90	•				•	•							
MB transfer case 8	80W		•		•									
Transfer case	80 W/85 W		o	•						•				
MB transfer case	80 W/85 W75W-90			•						•				
MB manual transmission														
G 1/15, 1/17, 1/18 1.) G 2/24, 2/27 G 3/36, 3/40 G 3/50 1.) G 3/60 1.) , 3/61 G3/70	80, 80, 80 W 1.) 80 W/85 W 1.)		•1.)		•1.)					•1.)				
G 1/D 14 G 3/45-6, 3/55-6, 3/65, 3/90 G 4/65-6, 4/95-6, 4/95-7, 4/110-6 G 65-7 G 100/125/135 155/180/200 G O 3/60, G O 3/80 G O	30, 40 80, 80 W 80 W/85 W (Hot zones SAE 90, 85 W-90)		•		•					•	•2.)			

4/95/105/120/130 G TO 24-5 G V 4/65-6, 4/95-6, 4/110-6														
GO 160/170/190/210	75W-90									•				
G 16/28/20/32/33	75W/8								•					
G 60, G56, G 85	75W/90W		•								o[2.)]	•		
G60, G56, G85 in tropical countries	40										•	•		
G100, G131-9, G210, G 211, G 240, G260, G131, G221, G230, G231	80W		•[3.)]		•[3.)]					•				
ZF manual transmission	80, 80 W 85 W 75 W/85 W (Hot zones SAE 90, 85 W-90)		•	•[4.)]	•					•				
ZF converter and clutch unit 400	30										•			
Voith retarder	10W, (30) 20 W-20													
AG4 - automatic part														
- final-drive assembly								•						
Sprintshift transmission (SSG)	75W/85W								•					
HA 746.211/216/217 HA 746.210 to M 140 993 HA 746.213 to M 138 406	80W-90						•						•	
HA 746.210 as of M 140 394 HA 746.213 as of M 138 407													•	

This table only serves as an overview!
• Should be used.
o Can be used.
⚠ When changing to a different oil:
Change service life factors in the maintenance system (WS) and pay attention to specified maintenance intervals

1. Only for: G 1/18-5, G 3/50, G 3/60 without MS synchronization
2. Use engine oils as under Sheet 235.12, SAE 30 for common oil circuits with ZF torque converter clutch 4
3. Transmissions with oil coolers only.
4. With intarder 5.)
5. Use engine oils as under Sheet 235.27, SAE 30 for common oil circuits with ZF torque converter clutch 4
6. Only install W 4 B 035 as of major assembly end no 00 57 33 or modified shift plate. 00 57 33 or fit modi shift plate.
7. Only for: G 1/18-5, G 3/50, G 3/60 with MS synchronization
8. Only use in exceptional cases! If no synthetic oil in accordance with 235.4 or 235.11 available.
9. ⚠ For Allison transmissions, it is absolutely essential to observe the application instructions on Sheet 231 under point 3.4!
10. Sheet 236.5 only for HT700

Major assembly	SAE grade	Sheet No.									
						Sheet	No.				
		236.1	236.12	236.123	236.5	236.1236	236.7	236.8	236.9	236.81	236.81
Mechanical steering	ATF			•							
MB manual transmission 7.) G 1/15, 1/17, 1/18 G 2/24, 2/27 G 3/36, 3/40 G 3/50 G 3/60, 3/61 G 3/70	ATF		•								
MB power steering	ATF		•	•		•	•				
ZF power steering	ATF		•	•		•	•				
Hydraulic fan drive for auxiliary radiator	ATF		•	•							
MB	ATF	•				•	•	•			•

automatic transmission											
MB automatic transmission W 4 B 035 6.)	ATF					•	•				
Voith/ZF automatic transmission	ATF	•				•	•	•	•		•
Allison transmission 9.)	ATF				o 10.)				•		
ZF 4 HP 20	ATF									•	
AG4 - automatic part										•	
- final-drive assembly											

This table only serves as an overview!
• Should be used.
o Can be used.
⚠ When changing to a different oil:
Change service life factors in the maintenance system (WS) and pay attention to specified maintenance intervals.

1. Only for: G 1/18-5, G 3/50, G 3/60 without MS synchronization
2. Use engine oils as under Sheet 235.12, SAE 30 for common oil circuits with ZF torque converter clutch 400
3. Transmissions with oil coolers only.
4. With intarder 5.)
5. Use engine oils as under Sheet 235.27, SAE 30 for common oil circuits with ZF torque converter clutch 400
6. Only install W 4 B 035 as of major assembly end no 00 57 33 or modified shift plate. 00 57 33 or fit modified shift plate.
7. Only for: G 1/18-5, G 3/50, G 3/60 with MS synchronization
8. Only use in exceptional cases! If no synthetic oil in accordance with 235.4 or 235.11 available.
9. ⚠ For Allison transmissions, it is absolutely essential to observe the application instructions on Sheet 231.0 under point 3.4!
10. Sheet 236.5 only for HT700

i **Application in vehicles/major assemblies refer to ? Sheet 231.1 (passenger cars, crosscountry vehicles) Sheet 231.2 (commercial vehicles)**

Product name	Customer, town/country
Adnoc Automatic Transmission Fluid (22665)	Adnoc Distribution, Abu Dhabi/United Arab Emirates
Agip ATF D 309	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip ATF II D	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Aral Getriebeol ATF 22	Aral Aktiengesellschaft, Hamburg, Germany
Autol Getriebeol ATF D	Agip Schmiertechnik GmbH, Wurzburg, Germany
Avia Fluid ATF 86	Avia Mineralol-AG, Munich, Germany
BayWA ATF 3000	BayWa AG, Munich, Germany
BP Autran MBX	BP p.I.c., London, England
Calpam Pamatic Fluid 289	Calpam Mineralol-Gesellschaft mbH, Aschaffenburg, Germany
Calypsol ATF-X	Conti Handelsgesellschaft mbH, Mannheim, Germany
Castrol TQD (22256)	Castrol Limited, GB Reading RG8 7QR, England
Divinol Fluid 666	Zeller + Gmelin GmbH & Co., Eislingen, Germany
ESA ATF Universal	ESA, Burgdorf, Switzerland
Finamatic II D	Total Lubrifiants, Paris la Defense Cedex, France
Frontol Universal ATF 100	Oelwerke Julius Schindler GmbH, Hamburg, Germany
Fuchs Titan ATF 3000	Fuchs Petrolub AG, Mannheim, Germany
Gulf ATF D II D	S.A. Espanola de Lubrificantes, Madrid, Spain
Igol ATF 420	Igol France, Amiens - Cedex/France
INA ATF Super	Maziva - Zagreb d.o.o., Zagreb/Croatia
KrafftATFD-21247	Krafft S.A., Andoain (Guipuzcoa), Spain
MB 236.6 automatic transmission fluid 000 989 92 03	DaimlerChrysler AG, Stuttgart, Germany
Motorex ATF IID	Bucher AG Langenthal, Langenthal/Switzerland
Motorex ATF Super	Bucher AG Langenthal, Langenthal/Switzerland
Oest ATF T 4011	Georg Oest Mineralolwerke GmbH & Co KG, Freudenstadt/Germany
OK Universal Automatic NR.551	ICPA, Dordrecht, Netherlands
oMV ATF D II	OMV Refining & Marketing GmbH, Vienna, Austria
PanolinATFMulti21996	Panolin AG, Madetswil, Switzerland
Petromin ATF II-D	Saudi Arabian Lubricating Oil Co., Jeddah, Saudi Arabia

Rasanta ATF-D	Muller Mineralole Handels-und Beratungsgesellschaft mbH, Eschweiler/Germany
Repsol Matic ATF	Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Shell DonaxTAD-21666	Shell International Petroleum Co., London, England
Shell DonaxTAD-21774	Shell International Petroleum Co., London, England
Sonol ATF-MB	Sonol Israel Ltd., Netanya, Israel
Sunamatic 153	Sun Oil Co. (Belgium) N.V., Aartselaar, Belgium
Texa matic 4011	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Total Fluide ATD	Total (Pty) Ltd., Johannesburg, South Africa
Total Fluide ATX	Total Lubrifiants, Paris la Defense Cedex, France
Valvoline ATF type D	The Valvoline Company, Lexington, KY/USA
Vat ATF Type D	VATOIL Europe, Oisterwijk/Netherlands
Wintershall ATF D	SRS Schmierstoff Vertrieb GmbH, Salzbergen, Germany
Wisura ATF 300 S	Wisura Mineralolwerk, Bremen, Germany

AUTOMATIC TRANSMISSION FLUIDS (ATF, SHEET 236.7) - BB00.40-P-0236-07A

i Application in vehicles/major assemblies refer to ? Sheet 231.1 (passenger cars, crosscountry vehicles) Sheet 231.2 (commercial vehicles)

Product name	**Customer, town/country**
Addinol ATF D II D	Addinol Lube Oil GmbH, Leuna, Germany
Caltex ATF-HDE	Chevron Texaco Technology Ghent/Gent, Zwijnaarde, Belgium
Classicfluid Dexron II D	Christian Luhmann GmbH & Co. KG, Hoya, Germany
Esso ATF D2	Exxon Mobil Corporation, Fairfax, Virginia, USA
Esso Automatic Transmission Fluid D (21638)	Exxon Mobil Corporation, Fairfax, Virginia, USA
Hid ro ATF	YPF S.A. Lubricantes & Especialidades, Buenos Aires/Argentina
Mobil ATF 220	Exxon Mobil Corporation, Fairfax, Virginia, USA
Motul Dexron ll D	Motul, Aubervilliers/France
Pennasol Fluid transmission fluid, type P/CN	Mineralol-Raffinerie Dollbergen GmbH, Uetze-Dollbergen, Germany
Q8Auto 14D-21883	Kuwait Petroleum, Hoogvliet RT, Netherlands
Ravenol Automatic-Getriebeoel Dexron D II	Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Shell DonaxTAD-21610	Shell International Petroleum Co., London, England
Shell DonaxTAD-21631	Shell International Petroleum Co., London, England
Texamatic 4291	Chevron Texaco Technology Ghent/Gent,

	Zwijnaarde, Belgium
Tor ATF 289	De Oliebron B.V., Zwijndrecht, Netherlands

AUTOMATIC TRANSMISSION FLUIDS (ATF, SHEET 236.8) - BB00.40-P-0236-08A

i Application in vehicles/major assemblies refer to ? Sheet 231.1 (passenger cars, crosscountry vehicles) Sheet 231.2 (commercial vehicles)

Product name	Customer, town/country
Addinol ATF DIIE	Addinol Lube Oil GmbH, Leuna, Germany
AgipATFIIE-(25367)	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Cepsa ATF Synthetic	Cepsa Lubricantes, S.A., Madrid, Spain
Elfmatic G2 Syn	Total Lubrifiants, Paris la Defense Cedex, France
Finamatic S 6726	Total Lubrifiants, Paris la Defense Cedex, France
Fuchs Titan ATF 5000 SL	Fuchs Petrolub AG, Mannheim, Germany
Gulf ATF Synt	S.A. Espanola de Lubrificantes, Madrid, Spain
Mobil ATF SHC	Exxon Mobil Corporation, Fairfax, Virginia, USA
Motorex ATF IIE Synthetic	Bucher AG Langenthal, Langenthal/Switzerland
OMV ATF-S	OMV, Refining & Marketing GmbH, Vienna, Austria
Panolin ATF Synth	Panolin AG, Madetswil, Switzerland
Q8 Auto 14 Synthetic	Kuwait Petroleum, Hoogvliet RT, Netherlands
Ravenol Dexron II E	Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Repsol Matic Sintetico	Repsol YPF Lubricantes y Especialidades, S.A., Mostoles-Madrid, Spain
Shell ATF XS	Shell International Petroleum Co., London, England
Teboil Fluid ES-Max	Oy Teboil AB, Suomen Petrooli Oy, Hamina/Finland
Texamatic-S E-25453	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Total fluide Syn FE	Total Lubrifiants, Paris la Defense Cedex, France
Wintershall ATF Dexron S E-25243	SRS SchmierstoffVertrieb GmbH, Salzbergen, Germany

LIQUID GREASE (NLGI GRADES 00/000) - BB00.40-P-0264-00A

Passenger car: Door lock striker bolts and locking eyes Commercial vehicles: Only for liquid grease central lubrication systems from Willy Vogel AG, Berlin/Germany

Product name	Customer, town/country
Acinol 8300 EP	Axel Christiernsson bv, Fijnaart, Netherlands
Aral Fliebfett N	Aral Aktiengesellschaft, Hamburg, Germany
Autol Getriebefliebfett ZSA	Agip Schmiertechnik GmbH, Wurzburg, Germany

Avialith 000 EP	Avia Mineralol-AG, Munich, Germany
BP Energrease ZS 00	BP p.l.c., London, England
Divinol Grease Central	Zeller + Gmelin GmbH & Co., Eislingen, Germany
Divinol ZSA grease	Zeller + Gmelin GmbH & Co., Eislingen, Germany
Fluid Grease KEC	Krafft S.A., Andoain (Guipuzcoa), Spain
Fuchs Renolit LZR 000	Fuchs Petrolub AG, Mannheim, Germany
INA LIS CS EP 00	Maziva Zagreb Ltd, Zagreb, Croatia
MB 264.0 liquid grease 001 989 08 51 10	DaimlerChrysler AG, Stuttgart, Germany
Mobil Chassis Grease LBZ	Exxon Mobil Corporation, Fairfax, Virginia, USA
Multifak 264 EP 00/000	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Multifak 6833 EP 00	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Oest Spezialfett LT 000 EP	Georg Oest Mineralolwerke, Freudenstadt, Germany
Optimol Olit 00-264	Castrol Industrie GmbH, Monchengladbach, Germany
Ravenol passenger car liquid ZSA grease	Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Rhenus Norlith FZM 00	Rhenus Lub. GmbH & Co KG, Monchengladbach, Germany
Rhenus Norlith FZS 00	Rhenus Lub. GmbH & Co KG, Monchengladbach, Germany
Shell Retinax CSZ	Shell International Petroleum Co., London, England
Texalube FF	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Tunap CargoLogic 619	Tunap Industrie Chemie GmbH & Co., Wolfratshausen, Germany
Unil Lycos ZS	Unil Germany GmbH, Stuttgart, Germany
Unil Opal Grease EPR 00	Unil S.A., Saumur, France
Wintershall Wiolub LFK 00	SRS SchmierstoffVertrieb GmbH, Salzbergen, Germany

MULTIPURPOSE GREASE (NLGI CLASS 2) - BB00.40-P-0267-00A

Passenger cars and cross-country vehicles:

For all grease lubrication points apart from, refer to ? Sheet 265.1 (passenger car front wheel hubs)

Sheet 264.0

Sheet 266.2

Sheet 269.2

Commercial vehicles: For all grease lubrication points apart from, ? refer to ?

Sheet 265.1 (passenger car front wheel hubs)

Sheet 264.0

Sheet 266.2

Sheet 268.0

Sheet 269.2

Product name	Customer, town/country
Acinol 152 TE	Axel Christiernsson bv, Fijnaart, Netherlands
Acinol 272 EP	Axel Christiernsson bv, Fijnaart, Netherlands
Agip Grease 30	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Aral Langzeitfett H	Aral Aktiengesellschaft, Hamburg, Germany
Aral Mehrzweckfett	Aral Aktiengesellschaft, Hamburg, Germany
Autol Universalfett	Agip Schmiertechnik GmbH, Wurzburg, Germany
Avialith 2	Avia Mineralol-AG, Munich, Germany
Avialith 2 EP	Avia Mineralol-AG, Munich, Germany
BayWa Multi-Fett 2	BayWa AG, Munich, Germany
BP Energrease LS 2	BP p.l.c., London, England
BP Energrease LZ	BP p.l.c., London, England
Caltex Marfak All Purpose	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Caltex Multifak EP 2	Caltex International Technical Center Pty Ltd, Australia
Chevron Dura-Lith EP 2	ChevronTexaco Global Lubricants, Richmond, CA 94802-0627, USA
Divinol Garant 2000 EP	Zeller + Gmelin GmbH & Co., Eislingen, Germany
Elf Multi	Total Lubrifiants, Paris la Defense Cedex, France
Fuchs Renolit 283 EP 2	Fuchs Petrolub AG, Mannheim, Germany
Grasa Ralitio EP-2	Raloy Lubricantes, Santiago Tianguistenco, Mexico
INA LIS EP 2	Maziva - Zagreb d.o.o., Zagreb/Croatia
Ironsides Lithoshield EP 2	The Ironsides Lubricants Ltd, Stockport, Cheshire, England
Lithac 142 SB	Axel Christiernsson bv, Fijnaart, Netherlands
Mobilgrease MB 2	Exxon Mobil Corporation, Fairfax, Virginia, USA
Multifak All Purpose EP 2	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Navigan Bamut 1000	Oelwerke Julius Schindler GmbH, Hamburg,

	Germany
Navigan Multipurpose Grease HL 2	Oelwerke Julius Schindler GmbH, Hamburg, Germany
Oest Mehrzweckfett GOC 190	Georg Oest Mineralolwerk GmbH & Co KG, Freudenstadt/Germany
Optimol Olit 2 EP	Castrol Industrie GmbH, Monchengladbach, Germany
Ravenol multipurpose grease OML	Ravensberger Schmierstoffvertrieb GmbH, Werther, Germany
Renolit MP	Fuchs Petrolub AG, Mannheim, Germany
Rhenus Norlith KSP 2	Rhenus Lub. GmbH & Co KG, Monchengladbach, Germany
Rhenus Norlith MZK 2	Rhenus Lub. GmbH & Co KG, Monchengladbach, Germany
Rhenus Norlith MZN 2	Rhenus Lub. GmbH & Co KG, Monchengladbach, Germany
Shell Retinax EPL2	Shell International Petroleum Co., London, England
Texaco Multifak B EP 2	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Texaco Multifak EP 2	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Wintershall Wiolub LFK 2	SRS SchmierstoffVertrieb GmbH, Salzbergen, Germany

COOLANT SPECIFICATIONS - BB00.40-P-0310-01A

NOTE: These regulations apply to the Mercedes-Benz, Maybach and smart brands.

1. **Coolant**

1.1 Coolant composition

1.1.1 Passenger car and commercial vehicle engines (normal case)

50 vol.-% Water

50 vol.-% Anticorrosion/antifreeze agents (see Sheet 325.0 or 325.2, 325.3) antifreeze protection down to approx. -37°C

Pre-mixed products in accordance with sheets 326.x can also be used.

1.1.2 Commercial vehicle engines (without antifreeze specification)

Blend of water and coolant additive in accordance with Sheet 312.0, for prescribed mixture ratio refer to Sheet 312.0.

Scope: With constant ambient temperatures above freezing point.

1.1.3 Commercial vehicle engines (exception, not for engines OM 500, OM 900, OM 457 and OM 460)

99 vol % Water

1 vol % Refining agent (see Sheet 311.0)

Scope: For constant ambient temperatures above freezing point, e.g. in tropical regions, in which it can be proven that no approved anticorrosion/antifreeze agents and coolant additives according to Sheet 312.0 are available.

⚠ Passenger-car engines, which are installed in a commercial vehicle, must always be filled up as for a passenger-car engine, refer to points 2.1/2.2.

[i] A quick-glance overview of the fields of application for the approved coolant additives and the prescribed change intervals are available in Section 5. Please note the mixing prohibition for Sheets 325.3 and 326.3!

1.2 Water

1.2.1 Fresh-water regulations/water treatment

Clean, and where possible, not too hard water should be used for processing the coolant. Drinking water frequently, although not always, complies with the given specifications.

Sea water, brackish water, brine and industrial waters are not suitable. The level of water containing dissolved substances can vary greatly depending upon its origin (ground, spring, surface water) and it is of major significance regarding the presence of corrosion.

Water that is too hard is disadvantageous because of the possibility of scaling or sludging occurring. Salt content, predominantly chloride, greatly promotes corrosion. If in doubt, analyze the water.

Information concerning the water quality of drinking water is available from the local water-plant authorities or the official water utilities on request.

If there is no available information regarding the quality of the drinking water then distilled or deionized water should be used.

If the water fails to comply with the approved analysis values, then it is be processed in a suitable manner, because even excellent anticorrosion/antifreeze agents are greatly impaired in their ability to protect against corrosion if water quality is poor.

Should it not be possible to soften the water then the water should be brought up to an approved hardness by an admixture of soft or distilled (deionized) water.

If the chloride or total ionic content of the water is too high, then the level can be reduced through the admixture of demineralized, in other words, ion-exchanged or distilled water.

Particular treatment processes will need to be used (desalination and demineralization or subprocesses) depending upon the contaminants present in the water. Information on how to conduct water treatment is available from water plants or water utilities as well as several companies and engineering consultants who are experienced in this area.

Depending upon the coolant composition, the analysis values for the water should lie within the following limits:

1.2.2 Fresh-water quality for coolant composition as under item 1.1.1 (passenger-cars and commercial-vehicle engines)

Sum total of alkalis (water hardness): 0 to 3.6 mmol/l (0 up to 20° d)*

pH value at 20°C: 6.5 up 8.5

Chlorine ion content: max. 100 mg/l

Total chlorides and sulfates: max. 200 mg/l

1.2.3 Fresh-water quality for coolant composition as under item 1.1.2/1.1.3 (commercial-vehicle engines)

Sum total of alkalis (water hardness): 0 to 2.7 mmol/l (0 up to 15° d)*

pH value at 20°C: 6.5 to 8.0

Chlorine ion content: max. 80 mg/l

Total chlorides and sulfates: max. 160 mg/l

If in doubt, contact DaimlerChrysler AG, department EP/MOR (operating fluids), C 405, D-70546 Stuttgart, Germany.

* Customary designations for water hardness in various countries: 1 mmol/l=5.6° d=10° f=7.02° e=100 mg/kg Ca $CO._3$.

1° d (German degree =1° dGH)=1.78° (French degree)=1.25° e (English degree)=17.9 mg/kg Ca CO_3 (USA hardness).

1.3 Premixed coolant

Several providers have water with premixed coolant in their product range. Provided they are approved (see below), they can also be used; the regulations relating to application, composition, change intervals,

etc. of these coolant specifications also apply. It is imperative that the correct concentration (50/50) is used in their application and, of course, further dilution is not permitted!

Approval status:

Coolants for all vehicle and engines (Basis 325.0) Sheet 326.0

Coolants for commercial vehicle and industrial engines (Basis 325.2) Sheet 326.2

Coolants for commercial vehicle and industrial engines (Basis 325.3) Sheet 326.3

The regulations for each respective Sheet 325.x are to be transferred correspondingly to Sheet 326.x.

At the time of compiling these regulations it is possible that not all the Sheets 326.x are represented with approved products.

2. **Coolant additives (General information)**

Normally, coolant consists of water and anticorrosion/antifreeze agents. The anticorrosion/antifreeze agents (ethylene glycol with corrosions inhibitors) in the cooling system have to fulfill, among other things, the following functions:

- to provide sufficient corrosion and cavitation protection for all cooling system components
- freezing point depression (antifreeze)
- increasing boiling point

For corrosion protection purposes the coolant

approx. 50 vol.-% Anticorrosion/antifreeze agents are added if the expected ambient temperatures do not require an even higher concentration. This concentration (50 vol %) offers frost protection up to approx. -37°C. A higher concentration is only necessary if the ambient temperatures are even lower.

Even with extremely low ambient temperatures, not more than 55 vol.-% anticorrosion/antifreeze agent should be used, because at this level the maximum antifreeze protection is reached and a greater concentration reduces the antifreeze protection again and decreases the heat dissipation (55 vol.-% corresponds to antifreeze protection down to approx. -45°C).

Should these coolant regulations fail to be observed then corrosion and damage to the cooling system are inevitable.

The admixture of anticorrosion/antifreeze agent serves to increase the boiling point. By raising the pressure the boiling temperature can be increased yet further. Both physical relationships are put to use in modern cooling systems - the maximum coolant temperature is raised, without increasing the danger of boiling. In keeping with the higher temperature level the cooling performance is also greater. Only approved products (Sheet 325.0/326.0 or 325.2 or 326.2, 325.3 or 326.3 as well as 312.0 or 311.0)

provide reliable cooling system protection. In special cases (commercial-vehicle engines, no antifreeze specification) coolant additives can be used that are primarily corrosion protection additives. In this case item 2.3 is valid.

As an exception, if neither anticorrosion/antifreeze agent conforming to Sheet 325.0 nor coolant additives without addition of antifreeze conforming to Sheet 312.0 are available, proceed according to point 2.4 (exception: OM 500 and OM 900). The systems described under items 2.2/2.3/2.4 are not compatible with each other. It is recommended to mix the entire coolant quantity outside the engine.

2.1 Anticorrosion/antifreeze agent for passenger-car engines

Alongside the correct constitution of the cooling water (point 1.2.2), care must be taken to ensure that only anticorrosion/antifreeze agents as approved for all engines in accordance with Sheet 325.0 are used. These products serve to guarantee that, in particular, an effective protection against corrosion is provided for all light-alloy parts in the cooling system and they are also specified for all passenger-car engines.

In order to ensure that the protection against corrosion is effective, the anticorrosion/antifreeze agent must remain in the cooling system throughout the year - including when in tropical climates - and regardless of the operating conditions. In countries with high outside temperatures this is also important in terms of raising the boiling point.

In the event that these regulations are not observed the cooling system may suffer from damage by corrosion. As a consequence of corrosion deposits there is a danger that ducts in the radiators (engine overheating) and heat exchangers (poor heat output) get plugged up thus causing damage to the engine.

As a result of the optimizations we have carried out on the system of engine/coolant/cooling system, in the majority of our newer passenger cars, a replacement of coolant is not necessary until reaching 15 operating years or 250,000 km (whichever comes first). This may not apply to some models; in these cases the maintenance booklet will stipulate another regulation.

2.2 Anticorrosion/antifreeze agent for commercial-vehicle engines (normal case)

(not: BR 600, BR 100 and BR 200)

The coolant in commercial-vehicle engines is made up of both water and anticorrosion/antifreeze agent (refer to item 1.1.1) and as such offers ideal protection against corrosion and cavitation.

All the approved products on the Sheets 325.2, 325.3 or 325.0 which are part of the Specifications for Operating Fluids can be used to select an anticorrosion/antifreeze agent. However, it should be noted that passenger vehicle engines built into commercial vehicles must be filled like passenger vehicles (e.g. OM 601 in T1), i.e. a product conforming to Sheet 325.0 and 326.0 must be used.

Products that are not listed in Sheets 325.0 and 326.0, or 325.2 and 326.2, or 325.3 and 326.3 are not approved and are therefore not to be used under any circumstances.

i **Anticorrosion/antifreeze agents or coolants conforming to Sheet 325.3 or 326.3 may be used for longer than other products due to their composition. The change interval is set at 5 years (refer to**

Overview Section 5). However, it should always be remembered that anticorrosion/antifreeze agents or coolants conforming to Sheet 325.3 and 326.3 must not be mixed with those conforming to Sheet 325.0 or 326.0 or 325.2 and 326.2.

2.3 Coolant additives for commercial-vehicle engines without antifreeze specifications (refer to item 1.1.2) (not: BR 600, BR 100 and BR 200)

In those application cases where no antifreeze is necessary, coolant for commercial-vehicle engines as under item 1.1.2 can be mixed to suit. It is impossible to cite generalized mixing proportions because the application concentrations of products included in Sheet 312.0 may be different. If the tolerances exceed or fall below those given in Sheet 312.0, then appropriate adjustments must be made. The coolant's boiling point is only insignificantly increased by these additives. The starting-off water underlies the more stringent regulations as under point 1.2.3. The usage period for this coolant is shorter than usual (see position 3). If it is necessary to refill, the same product must be used and at the same concentration level. The blending of different products is not permitted as stated in Sheet 312.0.

2.4 Coolant regulations for commercial vehicle engines (exception, not for engines OM 500, OM 900, OM 457 and OM 460)

In the event that neither an approved anticorrosion/antifreeze agent is available, nor a coolant additive in accordance with sheet 312.0 and if temperatures do not drop below freezing then it is possible in this exceptional case to use a coolant refining agent to 1 vol % if it is approved in sheet 311.0 (soluble corrosion protection oil). This will not raise the boiling point. The starting-off water itself underlies the more stringent regulations as under point 1.2.3.

The period of usage for this coolant, which may only be used in exceptional circumstances, is shorter than usual (refer to position 3).

⚠ **Water that is too hard may impair the emulsion resistance, with the result that the emulsion breaks down (oil separation) and the engine's water jackets are contaminated.**

2.4.1 Applying water refining mixture

When carrying out a new filling (initial filling or filling after a cleansing operation) an emulsion of 1.0-1.5 vol % should be used. When refilling, an emulsion of 0.5-1.0 vol % should be used. Concentrations that are too high (>1.5 vol %) do not improve the corrosion protection capability and may exert a negative influence on seals and hoses.

3. **Monitoring coolant operation**

It is very important to monitor the coolant constantly if the engine is to run trouble free.

The concentration level should be checked every six months.

The inspection should be conducted with suitable apparatus. If, when monitoring the concentration of the coolant, it is determined that the concentration of anticorrosion/antifreeze agent has reached 40 vol.% or less or an antifreeze protection of -28°C is no longer guaranteed, the concentration must be increased to

the regulation filling of 50 vol.% (-37°C). When topping up (after coolant loss), an anticorrosion/ antifreeze agent content in the coolant of at least 50 vol. % (antifreeze protection down to -37°C) must be ensured, or the concentration regulations according to point 2.3/2.4.1 must be observed. In closing an example is given in Overview Section 5.

⚠ **Non observance a observance of these regulations or the use of non-approved products will result in serious damage.**

The corrosion inhibitors diminish during operation and lose their protective capability. Coolant that is too old, and has lost its important inhibitors and anti-aging additives, becomes strongly corrosive. The coolant additives as under Sheets 311.0 and 312.0 will also age. This causes a deterioration in the level of protection capability, and with regard to coolant refining agents this will also cause the emulsion to break down.

For this reason it is important to replace the coolant, in order to ensure that its corrosion protection capability is retained. If necessary the cooling system should be thoroughly cleansed before refilling with the new coolant. A sufficient level of heat dissipation will only be given if the cooler surfaces are clean.

The maximum permissible period of usage for coolant is cited in Overview Section 5.

The use of approved operating fluids, which naturally include the anticorrosion/antifreeze agents, is a well-known constituent of the warranty conditions.

4. **Disposal of coolants**

The coolants are biologically-degradable material.

All statutory regulations or waste water regulations in each individual country with regard to the disposal of used coolant must be observed.

It is recommended to have the possibilities available for disposing of materials explained by the local responsible water authorities.

Currently in Germany methods are being compiled for the purification of used coolant. The separate collection of all used operating fluids is highly recommended.

However, as a consequence of the complex tasks asked of a modern coolant, it is on no account advisable to use an improperly "recycled" coolant, which has only undergone a mechanical pre-purification process

5. **Overview**

Which coolant additive, what change interval for which engines?

Passenger cars engines

Sheet No.	Engine series		Change interval years/km
	M100/M200	OM600	

325.0 and 326.0	•	•	15/250.000 [i] Whichever occurs first must be observed; Exception: in the vehicle's maintenance booklet shorter change intervals are stipulated

Commercial vehicles engines

Sheet No.	Engine series					Change interval Years
	OM 300	OM 457/460	OM 400	OM 500	OM 900	
311.0	•		•			0.5
312.0	•	•	•	•	•	1
325.0 and 326.0	•	•	•	•	•	3
325.2 or 326.2	•	•	•	•	•	3
325.3 or 326.3	•	•	•	•	•	5

Calculation of the antifreeze quantity to be refilled with a concentration that is too low (specified: 50 vol. %)

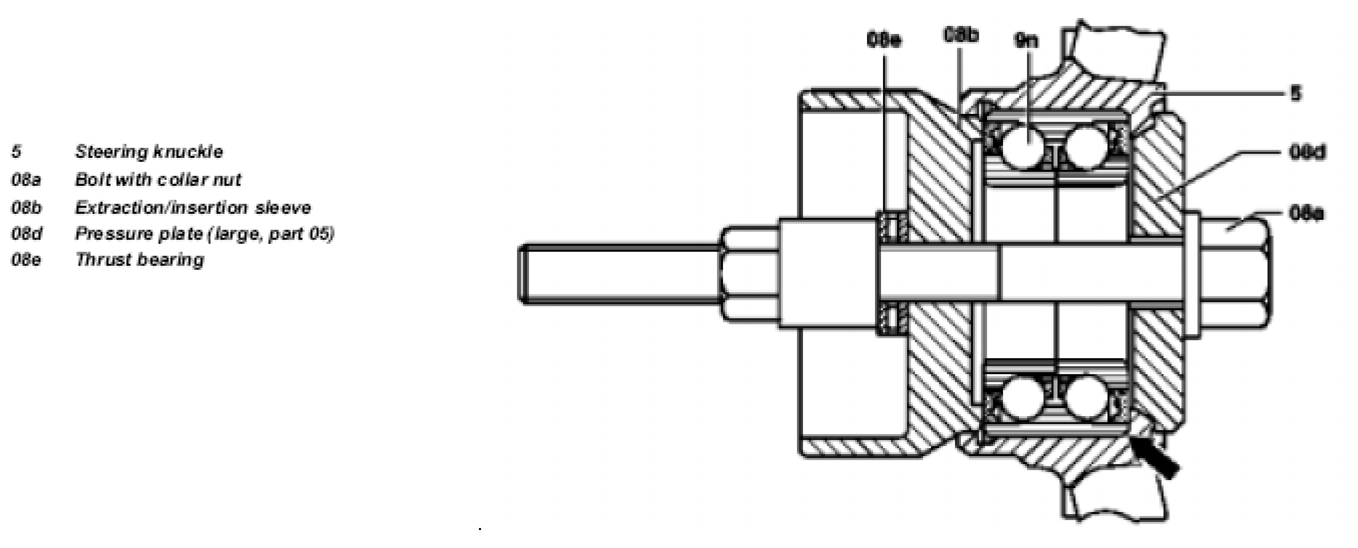


Fig. 645: Calculation Of Antifreeze Quantity - (1 Of 2)

Example of calculation:

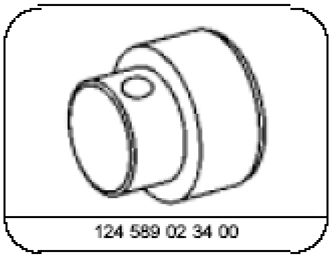


Fig. 646: Calculation Of Antifreeze Quantity - (2 Of 2)

Refrigerant protection/concentration table (approx.)

°C	-10	-14	-15	-18	-20	-23	-25	-27	-30	-33	-35	-40
vol %	20	25	26	30	32	35	37	40	42	45	47	50

ANTICORROSION/ANTIFREEZE AGENTS (SHEET 325.0) - BB00.40-P-0325-00A

Passenger vehicles and crosscountry vehicles, passenger vehicle engines in commercial vehicles: prescribed for all engines

Commercial vehicles and industrial engines: usable for all engines

Product name	**Customer, town/country**
Addinol Antifreeze Super	Addinol Lube Oil GmbH, Leuna, Germany
Agip Antifreeze Extra D	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Antifreeze Plus	ENI S.p.A. - Refining & Marketing Division, Rome, Italy
Agip Langzeit-Frostschutz	ENI S.p.A., Wurzburg/Germany
Anticongelante Diator Premium	Diator de Mexico, S.A. de C.V., Leon, Guanajuato, Mexico
Antifreeze RL-Plus	Raloy Lubricantes, Santiago Tianguistenco, Mexico
Aral Antifreeze Extra	Aral Aktiengesellschaft, Hamburg, Germany
Aseol Antifreeze	Shell Aseol AG, Bern, Switzerland
Avia Antifreeze APN	Avia Mineralol-AG, Munich, Germany
Behran Zagros	Behran Oil Company, Teheran - Iran
BP Isocool	BP p.l.c., London, England
Caltex CX Antifreeze Coolant	ChevronTexaco Technology Ghent, Ghent/Zwijnaarde, Belgium
Castrol Antifreeze NF	Castrol Limited, GB Reading RG8 7QR, England
Dragon Power Coolant A	S-Oil Corporation, Seoul, Rep. of Korea
Engen Antifreeze and Summer Coolant	Engen Petroleum Ltd., Cape Town, South Africa
Engman's - Super Antifreeze Coolant	Unico Manufacturing Co., Durban, South Africa
ESA Frostschutz G05	ESA, Burgdorf, Switzerland

ESA Antifreeze G48	ESA, Burgdorf, Switzerland
Eurol Afrostin	Eurol Produktionsges.m.b.H, Ried im Innkreis, Austria
EuroPeak Coolant/Antifreeze	Old World Industries, Inc., Northbrook, IL 60062, USA
EVOX Extra G48 Antifreeze concentrate	MOL-LUB Ltd., Almasfuzito, Hungary
Fridex G 48	Velvana, a.s., Velvary, Czech Republic
Fuchs Fricofin antifreeze	Fuchs Petrolub AG, Mannheim, Germany
Genantin Super	Clariant GmbH, Frankfurt/Main. Germany
Glacelf MDX	Total Lubrifiants, Paris la Defense Cedex, France
GlycoShell	Shell International Petroleum Co., London, England
GlycoShell N	Shell International Petroleum Co., London, England
Glysantin Anti Korrosion	BASF AG, Ludwigshafen. Germany
Glysantin G 48	BASF AG, Ludwigshafen. Germany
Glysantin mit Protect Plus	BASF AG, Ludwigshafen. Germany
Hightec Antifreeze AN	ROWE Mineralolwerk GmbH, Bubenheim, Germany
INA Antifriz Al Super	Maziva - Zagreb d.o.o., Zagreb/Croatia
Krafft Refrigerant ACU 2300	Krafft S.A., Andoain (Guipuzcoa), Spain
MB 325.0 anticorrosion/ antifreeze agents 000 989 08 25	DaimlerChrysler AG, Stuttgart, Germany
MB 325.0 anticorrosion/antifreeze agent 000 989 21 25	DaimlerChrysler AG, Stuttgart, Germany
Mobil GS 333 Extra	Exxon Mobil Corporation, Fairfax, Virginia, USA
Motorex Antifreeze G05	Bucher AG Langenthal, Langenthal/Switzerland
Motorex Antifreeze Protect G48	Bucher AG Langenthal, Langenthal/Switzerland
OMV Kuhlerfrostschutz	OMV Refining & Marketing GmbH, Vienna, Austria
Panolin Anti-Frost MT-325	Panolin AG, Madetswil, Switzerland
Permant 100	Oil Refinery Modrica, Modrica, Bosnia-Herzegovina
PO ozel Antifriz	Petrol Ofisi Anonim Sirketi, Istanbul, Turkey
Powercooling Concentrate Antifreeze	SMB, Passy, France
Procar Kuhlerschutz Extra	Hunold Schmierstoffe GmbH, Eching, Germany
Sasol Freezol	Sasol Oil (Pty) Ltd, Randburg, South Africa
Shell Tri Guard	Shell South Africa, Cape Town, South Africa
Total Antifreeze and Summer Coolant	Total Lubrifiants, Paris la Defense Cedex, France
Valvoline AntiFreeze Extra	The Valvoline Company, Lexington, KY/USA
York 716	Ginouves Georges S.A., La Farleade, France
Zerex G 05	The Valvoline Company, Lexington, KY/USA
Zerex G 48	The Valvoline Company, Lexington, KY/USA

GENERAL BRAKE FLUID - BB00.40-P-0330-01A

These specifications are valid for the Mercedes-Benz and smart brands.

General

The brake fluid in the brake system and in the hydraulic clutch operating system fulfills hydraulic tasks. Due to the high heat build-up during braking, these tasks can only be fulfilled by brake fluids which comply with all of today's technical requirements in terms of their various properties (viscosity-temperature-characteristic, boiling point, corrosion protection, oxidation resistance, etc.).

The most important properties which a brake fluid must exhibit are:

- High boiling point, to ensure that the brake fluid does not form vapor locks at high temperatures. Vapor locks reduce the operating pressure and thus the braking effect and may ultimately lead to brake failure.
- The boiling point should remain as constant as possible throughout the duration of use of the coolant and not drop under varying atmospheric influences or operating conditions (pressure, temperature), i.e. the "wet boiling point" should be as high as possible.
- Low compressibility, in particular at high temperatures.
- The low-temperature characteristic of the fluid - even when at 40°C - must permit operation, i.e. primarily, the viscosity must not become too high in the cold.
- Compatibility with the materials used in the brake units and clutch operating systems, e.g. the rubber boots or any other seal materials (elastomers) included in the brake components may only swell to a controlled extent, any shrinkage must be avoided.
- Sufficient corrosion protection for all metals present in the brake system.

The brake fluids released for use in MB vehicle models are listed on Sheet 331.0. These brake fluids not only comply with our requirements, but also those of the US safety specifications FMVSS 116, DOT 4. The released "DOT 4 plus" brake fluids (internal designation) are more advanced DOT 4 brake fluids with higher wet boiling point, standard change interval: 2 years. In order to be able to comply with this useful period without any problem, we strongly advise the use of released products as per Sheet 331.0, during the warranty phase this is a precondition for any acceptance of customer claims.

The brake fluid listed on Sheet 331.1 "DOT 4 Type 200" is released for special applications in the UNIMOG range with more stringent thermal requirements. For this type of use, a brake fluid change interval of 1 year must be adhered to.

Handling brake fluid

Brake fluid based on polyhydric alcohols in oligomer or polymer form and/or their

Esters are hygroscopic and thus absorbs moisture from the air. Water, however, reduces the boiling point of the brake fluid, whereby the danger of vapor lock formation is present. Therefore it should be noted that brake fluid is always stored in sealed vessels. Brake fluid that has been stored unsealed can absorb so much moisture in a few hours that it is rendered unusable.

Because the brake fluid also absorbs moisture through the vent bore on the expansion reservoir, the wheel brake cylinder and the brake hoses, the brake fluid has to be changed for safety reasons at regular intervals, best done in the spring. When performing this change, make sure that the old fluid is also drained off the clutch system. Generally, it is vital for the brake/clutch system to be completely drained before being filled with new fluid!

For the above-mentioned reasons, used brake fluid must not be used again.

The brake fluid is amber in color and thus can be easily confused with mineral products.

Therefore, brake fluids should always only be taken from original containers and stored separately from other mineral oils and fluids.

When performing maintenance operations and repairs on brake parts, make sure that fuel, mineral oil, grease or suchlike do not enter the brake system. Hydrocarbon-based materials will lead to swelling of the elastomers in the brake and clutch system and - even in low concentrations - will suffice to cause total failure of the systems.

Only new brake fluid may be used as a rinsing and cleaning agent for the cylinders, lines and the expansion reservoir of the hydraulic brake system.

Experience shows that before handling brake fluid, the hands must be cleaned and any oil and grease removed.

Brake fluid acts aggressively towards paint and color. In the event of any brake fluid spills or splashes, it must be rinsed away immediately using copious amounts of water (do not rub it away).

Brake fluid disposal

When disposing of brake fluid, the relevant national specifications must be observed. It is advisable to try to have the brake fluid disposed of as economic good; this is contingent on

- Strict separation of used brake fluid from other materials;
- Presence of a disposal channel, which justifies its classification as an economic good, i.e. a proper alternate usage must be assured.

If this procedure is not possible, used brake fluid is to be disposed of together with any, e.g. paint residue, solvents and suchlike. Any adding of used oil must be avoided, as it will result in difficulties, if the used oil is to be recycled; in several countries this is prohibited by the legislators.

MISCELLANEOUS NOTES

NOTES ON SCRAPPING GAS-FILLED HYDRAULIC COMPONENTS - OS00.00-P-1000-01A

all

Unusable gas pressure dampers, spring accumulators, pressure reservoirs and impact absorbers have to be depressurized before being scrapped according to the respective valid accident prevention regulations. These safety measures are necessary because gas pressurized hydraulic parts can explode if heat is applied. A risk of explosion is given, e.g. when scrapping with cutting torches, smelting or if gas pressurized parts in landfills start

to burn or are part of a smoldering fire.

The scrapping of gas-filled hydraulic parts can also be handed over to a scrap dealer who carries out the required safety measures. If accepted, the scrap dealer must sign an official declaration (see sample), in which he/she is bound to scrap gas-filled hydraulic parts in accordance with the respective valid accident prevention regulations.

This type of agreement however does require that it is absolutely impossible to retrieve shock absorbers from the scrap which can then be subsequently repaired. Any such devices therefore need to be damaged to permanently disable them for any reuse. To this end it is sufficient to bang the shock absorber pipe on a hard edge, to make a dent in it with a light hammer blow or to crush it slightly in a vise.

⚠ Danger! On no account should the piston rod be bent, this may cause an accident!

If agreements to render gas-filled hydraulic parts harmless, cannot be made with a scrap dealer, then the specified safety measures must be performed by the owner. For accident prevention reasons, safety glasses and gloves must be worn as protection against any escaping gas and oil as well as drill shavings. The balance holes are to be drilled with as little operating speed as possible. Any escaping oil is to be collected.

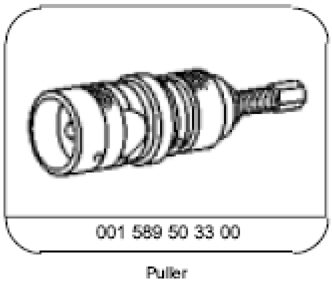


Fig. 647: Sheet Metal And Metal Scrap Declaration Form